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SHOP EQUIPMENT REVIEW

Semi-Annual Résumé of Machines, Tools and Accessories described in the Shop Equipment News Section of *American Machinist* during the First Six Months of 1928

Principal Developments

THE eleventh semi-annual shop equipment review number of the *American Machinist* covers in the American section 290, and in the European section, 107 machines and pieces of equipment described during the period ending June 30, 1928. The number of items described in the American section is considerably less than the number reviewed for the previous six-month period, 410 items, explained by the fact that the Cleveland exposition of the National Tool Builders' Association took place during the earlier period.

Few marked changes have taken place in the period covered in the present review. The trend toward single-purpose equipment is not as noticeable as before; in fact, a large majority of the machines described are of the general-purpose type. This statement is particularly true in regard to lathes, eight of which are of the standard engine type as against three special-purpose types. Heavier construction, positive lubrication, anti-friction bearings, alloy-steel gears, and a wider range of quick-shift speed changes are featured.

These same general features apply, in fact, equally as well to other improved lines. Another noticeable trend is toward the wider use of integral motor drive, even more marked than in previous periods. Hydraulic feeds also are finding wider application. Two-thirds of the manufacturing-type boring machines described are so equipped, but this is to be expected as this type of equipment was one of the earliest applications for this type of feed. Other applications are to the carriages of an axle-turning lathe, to internal grinders and, of course, to broaching machines.

The influence of automotive production demand may be seen in the fact that three cylinder-boring machines are described, one brake-drum grinder, a broaching machine for cleaning up welded rear axle housings, a chamfering machine for spiral bevel gears, and two valve refacers. Railroad tools embrace the axle lathe mentioned above, a drop-pit table, a rod grinder, and a miller for finishing car journal bearings.

Among the drilling machines are several of the special-purpose type and five portable electric drills up to 1¼ in. in capacity. Three gear hobbers of German make were introduced into this country, two generators of American manufacture were announced, and one hob checker of very complete range was placed on the market. As in previous reviews, grinding machines occupy the largest section. The machines are largely of the general-purpose type, including three cylindrical grinders and two internal grinders, both featuring automatic wheel-truing devices and hydraulic feed. The special-purpose machines include knife, roll, valve, brake-drum and locomotive side-rod grinders.

Simplicity of control from a centralized position is the object of design of nearly all classes of units described. Convenience of operation is particularly stressed in one line of milling machines to the extent that dual control is possible, from front or side. Another advance in milling machine design noted is the application of unit heads to a planer-type machine.

In the press section are described a complete line of presses introduced by a company which developed them first for its own use. A press of unusual size, weighing 200 tons, is shown, as well as several feed devices. A shear with a knife pressure of 700 tons is described. Fourteen welding machines are listed, eight of them being portable or semi-portable motor-generator sets. Four butt welders of general- and special-purpose application are mentioned.

Among the group classified as "Other Machines" are: three vertical hydraulic broaching machines, all made by the same company; three chucking machines, each of rigid construction and one departing widely from conventional design; an automatic rod magazine for use with screw machines, a die-casting machine, and an automatic polisher for flat articles. In other sections, a dynamic balancing machine of advance design is noted; so is a stroboscope for studying machines in motion, whether they be watches or locomotives. An unusually large number of electric motors and controllers are to be found. Other units described include an electrically-heated oil bath, lead bath, glue pot and tinning pot. An all-metal silent gear is also noted.

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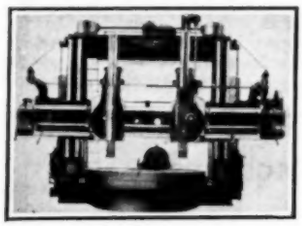
Boring and Turning Machines

— 1 —

Boring and Turning Mill, 12-Foot, Niles

Niles Tool Works Co., Division of Niles-Bement Pond Co., Hamilton, Ohio. [Vol.68,p.237]

Some of the features of this 12-ft. boring and turning mill are double table tracks with pressure lubrication, sliding-gear feed boxes, forged steel boring bars, crossrail of square box section with bearings on the



face of the housing and extending back between the housings, separate motors for rapid traverse of bars and saddles, direct-reading micrometer dials for saddle and bar movements, limit switch for the elevation of the crossrail, and totally-inclosed drive box with all steel gears and pressure lubrication. The right-hand head is equipped with a thread chasing attachment of the lead-screw type giving leads up to 2 inches.

The machine is driven by a 35-hp. variable-speed d.c. motor, giving table speeds ranging from 0.56 to 10.8 r.p.m. A 7½-hp. motor is used for elevating the crossrail and two 5-hp. motors, one for each head, for the rapid traverse of the saddles and bars.

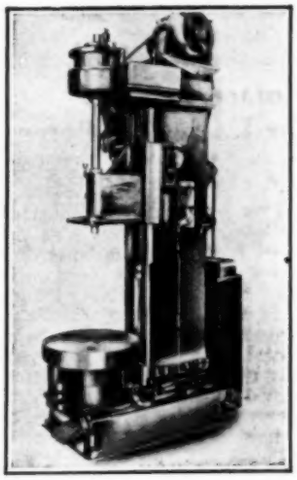
— 2 —

Boring and Drilling Machine, Hydraulic Feed, No. 10H

Baker Bros., Inc., Toledo, Ohio. [Vol.68,p.1026]

Hydraulic feed has been applied to this boring and drilling machine which has the features of rapid advance to work, automatic tripping to the proper feed and rapid return. The points of change from rapid advance to feed and to rapid return can easily be changed by cams mounted on the side of the saddle. The illustration shows the machine fitted with a flanged head to which a multiple head can be attached, but a single-spindle head can also be used. To maintain the proper setting of the tools in the multiple-spindle machine, a 3-in. vertical adjustment is provided.

Only motor-driven units can



be furnished. The power is transmitted to the main drive shaft by means of a Texrope drive. A wide range of feeds can be secured by adjusting the Oilgear pump which is driven from the main drive shaft. A 10-hp. 1,200-r.p.m. motor furnishes ample power. Speeds ranging from 165 to 245 r.p.m. are available at the main vertical drive shaft.

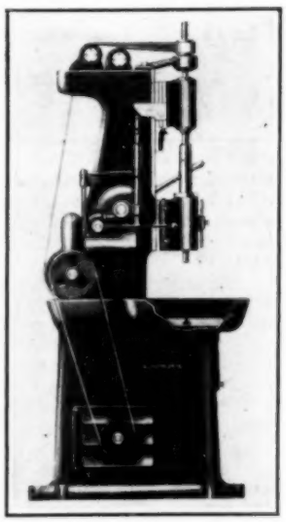
The travel in the head is 16 in. The machine can be fitted with a plain table for single-spindle work, or with an indexing table 24 in. in diam. for multiple-spindle jobs.

— 3 —

Boring Machine, Diamond-Tool, Single-Spindle

Automatic Machine Co., Bridgeport, Conn. [Vol.68,p. 1061]

This single-spindle Coulter diamond-tool boring machine is designed for the precision bor-



ing of a variety of work, such as non-ferrous bushings, bearings and valve bodies. The spindle end is arranged with an internal thread and taper pilot so that the diamond boring tools can be mounted in detachable holders.

The column of the machine is a box section, having the 3-hp. motor placed inside the base. The feed mechanism is located between the sides of the column above the splash pan. An adjustable tapered bronze sleeve bearing 9-in. long carries the driving spindle. Ball bearings sustain the belt load, thus relieving the lower bearing of any lateral strain. The spindle and boring bar are closely lapped on their bearing surfaces.

The boring bar is separate from the driving spindle, and is attached to it by means of a special floating coupling of the Oldham type.

The operating speed of the spindle is about 4,000 r.p.m. The fixture platform measures 12x22-in., and the distance between the spindle bearing and the platform is 12 in. Boring can be done to a depth of 6 in., and the spindle throw is 6 in.

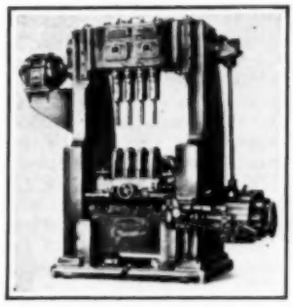
Floor space 30x36 in.; weight 2,500 pounds.

— 4 —

Boring Machine, Cylinder, Four-Spindle, No. 8, Extra-Heavy

Defiance Machine Works, Defiance, Ohio. [Vol.68,p.356]

Although the special No. 8 cylinder boring machine was built as a single-purpose production unit for the rough boring, semi-finishing, and reaming of the cylinders of four-cylinder tractor engines, it can be de-



signed as a fixed-center machine for any number of boring operations on either tractor or automobile cylinders, cast en bloc or singly. It is built throughout for heavy duty.

The frame and base castings are broad and heavy and internally ribbed. Long slides, scraped and gibbed, carry an auxiliary sliding table operated by a screw feed through a separate motor mounted on the back of the machine. Levers for operating the table are conveniently placed at the front of the machine. The table is raised and lowered through a pair of jack screws actuated by a heavy worm and wormwheel. All thrusts are taken by SKF bearings.

The feed mechanism is of unit construction and tightly incased to provide its own lubrication system. A hand adjustment for the table feed is provided but, when in operation, the table automatically feeds the work up to the boring tools, and then reverses at a rapid rate.

The drive to the spindles is by belt from a three-step cone pulley or from a motor direct-connected to the drive shaft. The spindle is supported by three bronze bearings and floats between two sets of SKF ball thrust bearings.

Floor space 11 ft. x 6 ft. 10 in.; weight 21,330 lb. net.

— 5 —

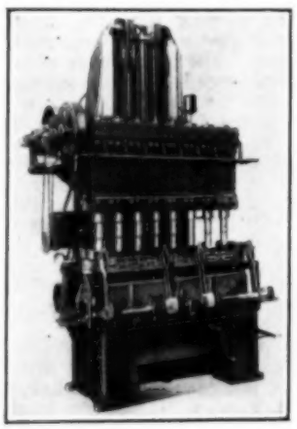
Cylinder Borers, Hydraulic Feed, No. 13 and No. 10D

Moline Tool Co., Moline, Ill. [Vol.68,p.391]

Both machines employ Oilgear equipment for furnishing the hydraulic feed. The No. 13 machine is the larger of the two and is recommended for heavy roughing operations since piloting of the boring bars at either the top or bottom is unnecessary. The No. 10-D machine is similar to the No. 13 except that it is somewhat smaller and the spindle units have tapered bronze bearings instead of roller bearings for closer center distances. This unit is recommended where the boring bars are piloted at the top and bottom of the fixture.

The double V-guide is the feature of the slide and column. With the hydraulic-feed cylinder mounted centrally between the two guides, any possibility of the slide weaving during heavy cuts is eliminated. Anti-friction bearings are used on all drive shafts including the main spirals.

The entire control of the feed



cycle is automatic. When the operator shifts the starting lever, the rail on which the spindles are mounted is brought down rapidly to the cutting position, whereupon the lever shifts to the slow feed. Upon completion of the boring operation, the lever again shifts automatically to reverse position giving a rapid return to the rail units. The rate of speed can be varied.

The main drive is either direct by motor or from a countershaft. From the main drive shaft the power is transmitted to the hardened spiral drive shaft through spur gears which are also hardened.

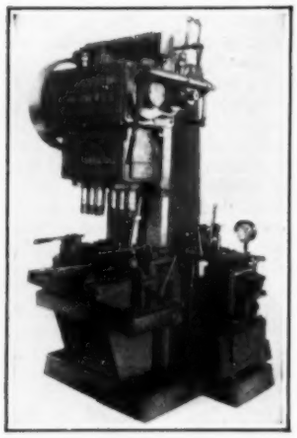
Floor space required: No. 13, 7 ft. 8 in. x 6 ft. 4 in.; No. 10-D, 7 ft. 2 in. x 5 ft. 4 in. Shipping weights, 22,925 and 16,500 lb., respectively.

— 6 —

Boring Machine, Cylinder, Multiple-Spindle, Hydraulic-Feed

Baker Brothers, Inc., Toledo, Ohio. [Vol.68,p.514]

This machine is made with fixed centers and any required spacing can be furnished for two-, four-, six- or eight-cylinder blocks. It has a table feed actuated by an Oilgear hydraulic pump with rapid advance to the work, automatic engage-



ment of feed at any predetermined point and automatic rapid return. The positions at which the changes from rapid traverse to working feed takes place and the rate of feed can easily be varied.

The spindles are of forged high-carbon steel and are carried in two taper adjustable bearings located at the lower end of the head close to the cut. The construction is such that the boring bars need no support either on roughing or finishing cuts.

The machine can be furnished either for belt or motor drive. The main drive in the head of the spindles is through hardened alloy-steel gears, the shafts being mounted in ball bearings. Standard equipment includes a 2-hp. motor for the Oilgear pump drive, and an automatic lubricator for all gears and bearings on the machine.

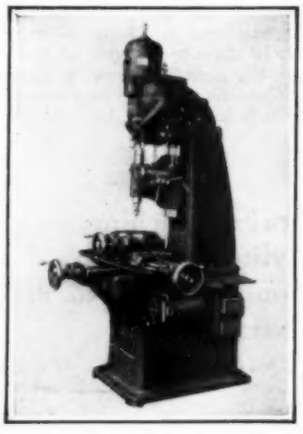
— 7 —

Jig Borers, Nos. 1 and 1A

Pratt & Whitney Co., Hartford, Conn. [Vol.68,p.749]

These jig borers were introduced for small precision work and are similar to the larger sizes marketed by this company. A rectangular column carries a vertically sliding spindle head, speed- and feed-change gear box, and the driving motor. A saddle is gibbed to slide horizontally upon the base in a direction to and from the column, and upon the saddle is a table capable of movement at right angles to it.

The saddle and table are posi-



tioned by hand-operated screws, and inside micrometers, and measuring rods or precision gage blocks are employed in connection with dial indicators to measure the distances traversed.

The differences between the No. 1 and No. 1A machines are in the height and weight. The spindle has a vertical range of 4-in. in the head, and a vertical adjustment of 5 in. on the column. The center of the spindle is 9½ in. from the face of the column. The maximum distance from the working surface of the table to the end of the spindle is 10¾ in. in the No. 1 machine, and 15½ in. in the No. 1A machine. The working surface of the table is 9¾x18 in. The crosswise travel of the saddle is 10 in., the longitudinal travel of the table is 18 in. and the traverse is 10 inches.

The spindle is driven by a four-speed electric motor mounted vertically at the top of the column, and through back gears eight spindle speeds from 132 to 1,800 r.p.m. are available.

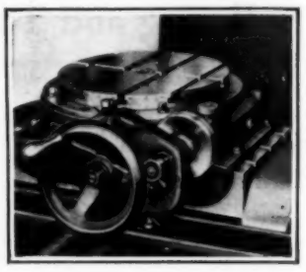
The No. 1 machine stands 95 in. high and occupies 58½x59 in. of floor space. The No. 1A machine is 5 in. higher and occupies the same floor space. The weights, which include driving motor and all regular equipment, are 2,650 and 2,800 pounds.

— 8 —

Rotary Table for Use on Jig-Borer

Pratt & Whitney Co., Hartford, Conn. [Vol.68,p.754]

This rotary table is intended for use in connection with the Pratt & Whitney jig borer, but is suitable for work upon milling machines. The circular table is 12 in. in diam. It is crossed on one diameter by a T-slot, and at right angles to this by four similar slots, thus providing ample opportunity to secure work to it by means of T-head bolts. The circumfer-



ence of the table is graduated in degrees around the full circle.

The table is rotated by a hardened-steel worm that meshes with teeth cut in the periphery of the table itself and is entirely inclosed. A handwheel of large diameter rotates the worm and turns the table quickly to the approximate setting, after which the finer adjustment is made by a micrometer-graduated dial.

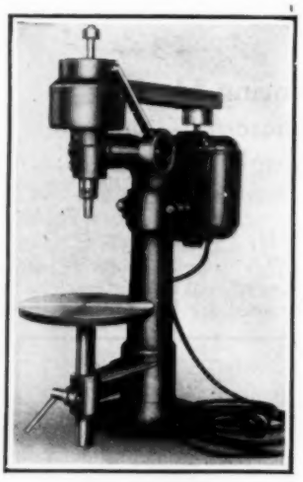
Drilling Machines

— 9 —

Drill, Bench, Sensitive, 10-Inch, No. 222

Burke Machine Tool Co., Conneaut, Ohio. [Vol.68,p.754]

Elimination of vibration is the principal feature of this sensitive bench drill. The motor



bracket is of rigid construction and has an overhang of 5¼ in. The motor furnished is built for tools of this nature, speeds of 1,150 to 2,600 r.p.m. are provided by means of a two-step cone pulley.

The spindle is tapered to fit either Jacobs or Almond chucks of ½-in. capacity, and is counterbalanced through the pinion. The vertical movement of the spindle is 2½ in., the vertical movement of the table is 7 in., the greatest distance from the spindle to the table being 9¾ in. The diameter of the table is 8 inches.

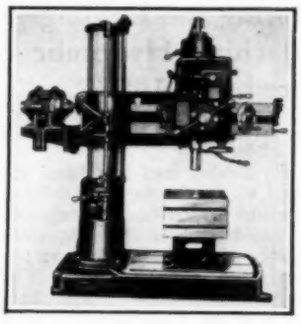
— 10 —

Drilling Machine, Radial, High-Speed, Timken Equipped

Morris Machine Tool Co., Cincinnati, Ohio. [Vol.68,p.195]

Power, rigidity, and strength have been built into this high-speed, all-geared radial drill. The machine is built in 3- and 4-ft. sizes. Other features are hardened gears, heat-treated multiple-spindle shafts and spindles, multiple-disk clutches, positive lubrication and centralized control. The machine has been simplified.

All speed and feed changes are located in the head, and are made with conveniently-located levers through sliding gears. There are twelve speeds avail-



able ranging from 125 to 1,600 r.p.m., and six feeds from 0.004 to 0.025 in. per revolution.

The entire head and back bracket are automatically lubricated.

The machine is equipped throughout with Timken roller bearings except for the tapping-attachment bevel gears, where double-row ball bearings are used. The spindle is mounted

on roller bearings in a heat-treated steel sleeve of large diameter. The elevating, lowering and clamping of the arm is controlled by a single lever. There is a safety friction device on the elevating screw.

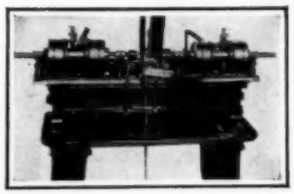
The entire machine, including the elevating device, is run by one constant-speed motor mounted on the arm and geared direct to the drive shaft. The machine has a capacity for running a $\frac{7}{8}$-in. drill at 80 ft. per min., and has sufficient power to drill a $1\frac{1}{4}$ in. hole in steel.

— 11 —

Drilling and Tapping Machines, Combination, Horizontal

C. B. Mahan, 162 Longview Terrace, Rochester, N. Y. [Vol. 68,p.712]

High production drilling, tapping, threading, counterboring, inserting screws, heading over rivets and other operations are made possible by these horizontal combination machines. Both bench and floor types of double-



spindle machines together with a single-spindle bench machine are available.

The horizontal spindle is fed forward by a yoke actuated by a foot pedal. By means of this mechanism and suitable jigs, it is possible to tap to definite depths. The machine automatically reverses when it bottoms. The difference between leads and cutting speeds of the various taps used is compensated for by means of a spring.

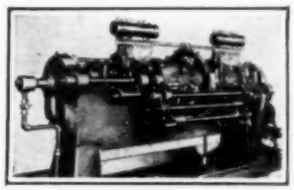
Model 1, illustrated, is a combination two-spindle machine of the floor type. The chucking arrangement is automatic and grips the pieces before the tool engages it. Model 2 is a miniature of Model 1 and has a much higher speed. Over 3,400 No. 4 holes were tapped per hr. on this machine.

— 12 —

Drilling Machine, Horizontal Automatic, Special

Davenport Machine Tool Co., Inc., Rochester, N. Y. [Vol.68, p.901]

Continuous operation in drilling and countersinking three holes in a door hinge is the principal feature of this specially adapted automatic drilling machine. The design permits the use of five sets of work-holding fixtures and drilling heads which revolve continuously while the cutting and clamping operations are being performed. In operating this machine, the work is placed in the fixture and, as



the unit revolves, the work is automatically located and clamped. Three spindles in a cluster box on the left-hand end of the machine drill and countersink the holes simultaneously after which they are withdrawn and three more spindles on the right-hand end countersink the other side. After this operation the clamping device is automatically released and the work is dropped into the pan. Production is quoted at 1,200 pieces per hour.

The spindles are driven with good-sized, hardened steel gears, and the spindles themselves are hardened and run in phosphor bronze bearings with ball thrust bearings. The drill spindles are fed by a cam located on one end of the machine. Ample cutting compound is forced by a geared pump through the center of the machine to each of the tools.

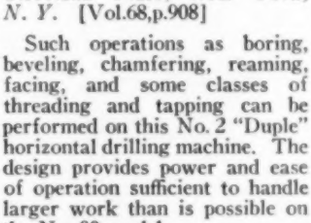
— 13 —

Drilling Machine, Horizontal "Duple," No. 2

John B. Stevens, Inc., 27 Cleveland Place, New York, N. Y. [Vol.68,p.908]

Such operations as boring, beveling, chamfering, reaming, facing, and some classes of threading and tapping can be performed on this No. 2 "Duple" horizontal drilling machine. The design provides power and ease of operation sufficient to handle larger work than is possible on the No. 00 model.

The front of the machine is of deep, massive construction, and



the heads are of similar construction and are gibbed down to the bed with adjustable taper gibs. The fixture table is placed at the center, and has slots $\frac{3}{4}$ in. wide running through the center and parallel to the bed. The dimensions of the plate are 12x16 in. The maximum distance between the spindles is 36 in., and both plain- and back-gear head styles are available. A swing of 14 in. over the Vs is obtainable on both styles.

Each head is fed forward by a square-threaded screw revolving in large ball bearings. The spindles also revolve in ball bearings. Four change gears are furnished which permit three different feed changes. The first machine will drill a $1\frac{3}{8}$-in. hole in cast iron, and the second will drill a $1\frac{1}{4}$-in. hole in the same material. Hand and automatic trip for the feeds are provided, and also a positive stop.

Floor space of each, 80x24 in.; weight, 2,450 and 2,600 lb., respectively.

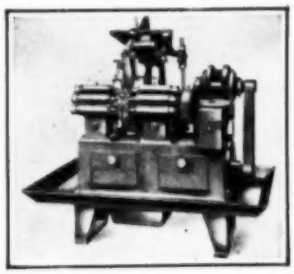
— 14 —

Drilling Machine, Automatic, Multiple-Spindle, Special

Diamond Manufacturing Co., Cleveland, Ohio. [Vol.68,p.74]

Cross holes $\frac{1}{8}$ in. in diameter are drilled in the faces of the heads of $\frac{1}{2}$-in. capscrews by means of this special multiple-spindle automatic drilling machine. Three spindles are mounted in each of the two sliding heads, and the feed is obtained from cams.

The screws are automatically fed from a hopper to an index-



ing disk mounted in a vertical position. In the first drilling position, two sides of the hexagon head are drilled. The drills are then withdrawn, and as the wheel is indexed to the second position, the screw is indexed one-sixth of a turn for the second drilling operation, after which the screw is again indexed and carried to the third spindle for the final drilling operation. After this, the screw is ejected.

The machine is designed to allow for various arrangements of the head, spindles, and drilling fixtures to suit requirements. The main drive shaft at the rear of the machine, the intermediate shaft, spindle, idlers, and worm shafts are all mounted on ball bearings. The camshaft runs in bronze bearings of ample size.

— 15 —

Drill, Electric, ½-Inch Standard

Van Dorn Electric Tool Co., Cleveland, Ohio. [Vol.68,p.36]

This standard $\frac{1}{2}$-in. electric drill was designed for maintenance work in factories and machine shops. The motor operates on either a.c. or d.c., and has a no-load speed of 540 r.p.m. and a full-load speed of 300 r.p.m. The armature is carried

upon ball bearings, and the thrust is taken by ball bearings. Hardened alloy steel gears are used.

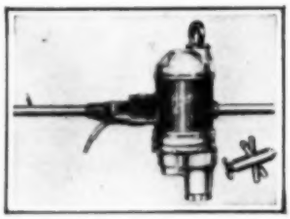
The drill is equipped with a combination spade and breast-plate handle, three-jaw chuck and 10 ft. of cable with a plug. It is furnished for use with 32-, 110-, 220- and 250-volt circuits.

— 16 —

Drill, Universal, Electric, 1¼-Inch

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.68,p.517]

Some of the noteworthy features of this machine are the motor which is mounted in ball



bearings, the adjustable brush holders mounted as a separate unit and the gears which are all heat-treated. The spindle is hardened and ground, and is automatically lubricated through the gear case. It is fitted with a No. 3 Morse taper socket.

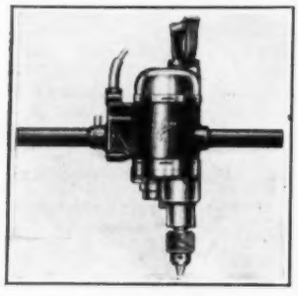
— 17 —

Drill, Electric, ½-Inch, "Hisey"

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.68,p.715]

The ball bearings of this $\frac{1}{2}$-in. portable drilling machine are fitted in a way to eliminate slip

and creeping action. Where necessary, the spindles, which are of large size, are hardened and ground. As in the larger machines made by the same company, the brush-holders have



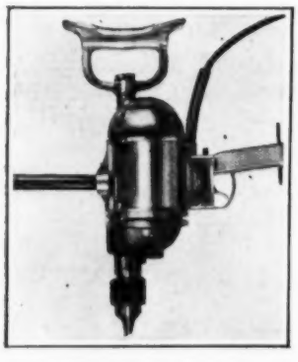
adjustable spring tension and are mounted as a separate unit on a Bakelite yoke, thus permitting brush adjustment.

— 18 —

Drills, Electric, Portable, Nos. 658 and 634

Millers Falls Co., Millers Falls, Mass. [Vol.68,p.901]

These portable electric drills are equipped with universal motors to operate on either d.c. or a.c. at 60 cycles. The spindle runs at 300 r.p.m. at full load and 500 r.p.m. at no load. The smaller size will drill ⅝-in. holes in steel and 1-in. holes in hard



wood, while the larger size has a capacity of ¾- and 1¼-in. holes, respectively.

The gears are of heat-treated alloy steel. The spindle runs in bronze-brushed bearings, and is equipped with a ball thrust bearing. In each case the motor shaft runs on ball bearings. The aluminum housing is ventilated to insure cool running. The spade handle and breast plate are adjustable. Jacobs drill chucks and 15 ft. of rubber covered cord and an armored plug are furnished with each outfit. Current reaches the motor through a double-pole trigger switch.

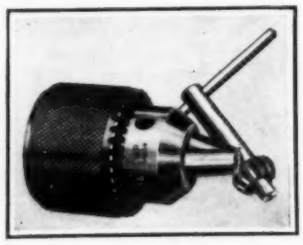
The overall lengths are 19¼ in. for the No. 658 and 19¾ in. for the No. 634. Weights are 20 and 20¼ lb. respectively. Motors can be furnished for 110, 150, 220 and 250 volts.

— 19 —

Drill Chuck, Model 36

Jacobs Manufacturing Co., Hartford, Conn. [Vol.36,p.75]

This No. 36 chuck has a capacity to hold drills from $\frac{3}{16}$ to ¾ in. in diameter, and is designed



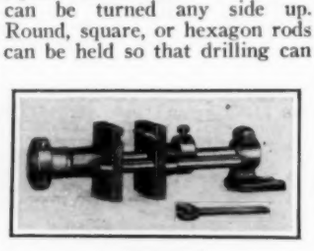
especially for use in connection with portable tools. The weight of the chuck is 2¾ lb. Portable tools equipped with this chuck can make use of not only straight-shank drills, but also taps, reamers and spindles of honing devices.

— 20 —

Drill Press Vise, Special No. 1

Miller & Crowningshield Co., Greenfield, Mass. [Vol.68,p.394]

This device has jaws machined square on all sides so that it can be turned any side up. Round, square, or hexagon rods can be held so that drilling can



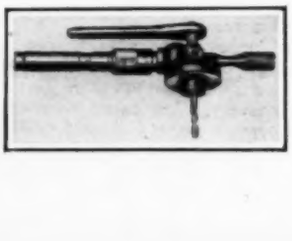
be done on the end or on the sides. By loosening the clamp screw in the collar, the operator can slide the rear jaw to any position and rigidly clamp it. The work is held by tightening a clamp knob at the front of the jaw. The jaws have a width and height of 3½ in., and have a maximum opening of 6 in.

— 21 —

Drilling Head, Angle

Stow Manufacturing Co., Binghamton, N. Y. [Vol.68, p.477]

This attachment is particularly adapted to drilling in out-of-the-way places. It derives its



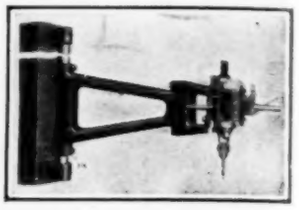
power through a flexible shaft which may be driven by an ordinary electric drill or any available motor. It is furnished with ½-in. capacity, but may be had in other sizes with 1½-in. screw-feed and ratchet handle. The socket takes standard Morse taper drills and, where space permits, a chuck may be applied.

— 22 —

Drilling Arm, Double Radial, Sensitive, "Hisey"

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.68,p.1027]

Double arms which can be swiveled through wide ranges of arc and then locked in position are the principal features of this sensitive radial drilling arm. The apparatus can be furnished to carry all Hisey portable electric drills up to and including



the ¾-in. size illustrated above.

This drilling arm is mounted on a ball thrust bearing which is inclosed and dust-proof. A total vertical adjustment of 32½ in. results from a 7½-in. travel with a rack and pinion adjustment and a 25-in. travel from a column adjustment. Either the long or short arms can be locked independently in any fixed angular position. The maximum arm reach from column to drill spindle is 36¾ in., and it can be swung through an arc of 240 deg. while the short arm has an angular adjustment of 245 degrees. Weight 215 lb. net.

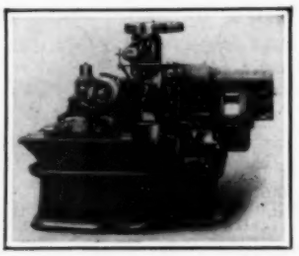
Gear Cutting and Testing Machines

— 23 —

Hobber, Production, Pfauter, No. 9

O. Zernickow Co., 15 Park Row, New York, N. Y. [Vol. 68,p.476]

This machine is intended for heavy-duty production work at high speed. It has a single-pulley drive, and can be arranged for direct-connected electric motor drive. The hob speeds are obtained through change gears which have large tapered



bores and are therefore quickly put on or taken off. A heavy flywheel on the driving pinion imparts a steady motion to the hob. The No. 9 machine is suitable for cutting spline shafts and spur gears of small diameter, heavy pitch and wide face and also worms for automobile rear axles. The work is held between centers in split collets. Hob arbor diameter is 1¼ inches.

The machine will accommodate hobs with a diameter of 5¾ in. and a length of 5½ in. The number of teeth which can be cut varies from 4 to 100 and the maximum pitch is 2½ D. P. Hob speeds from 44 to 127 r.p.m. are available.

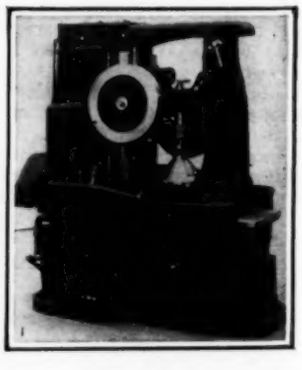
Floor space 69x86 in.; weight, 5,500 lb. net.

— 24 —

Gear Hobber, High-Production, Pfauter, R.I.H.

O. Zernickow Co., 15 Park Row, New York, N. Y. [Vol. 68,p.709]

This special-purpose Pfauter hobber will take a wide variety of work as is evidenced by the fact that spur gears up to 12 in. in diam. and having 5 D.P. may be cut with a maximum hobbing width of 8 in. The work is mounted rigidly on a vertical work arbor so that the chips fall clear of the hob and work. The work arbor support is



solidly connected to the machine column. The horizontal arm of the work arbor support has a movable center. These two features of the arbor support permit working with interchangeable work arbors. An internally-toothed gear cut in the flywheel drives the hob spindle. Hob speeds of 62, 89, 125 and 175 r.p.m. are attained through

the operation of change gears.

The hobbing head carries two super-imposed shafts, the spindle shaft and the hob drive spindle. Each of these shafts carries at its outer end a large flywheel to equalize the torque. A counter weight balances the hobbing saddle.

The dividing-gear drive consists of a wormwheel and a worm, adjustable both axially and radially. The rates of hob feed are from 0.028 to 0.236 in. in many steps. At the end of the cut the hobbing saddle returns automatically at a quick rate to its starting position. Hand traversing can also be effected at any time.

A powerful coolant pump is provided, as is a lubricant pump. The machine is driven by an 8-hp. motor.

Floor space 28x16 in.; weight, 5,300 lb. net.

— 25 —

Gear Hobber, Universal, Automatic, Mikron, No. 102

Triplex Machine Tool Co., 50 Church St., New York, N. Y. [Vol.68,p.945]

Precision hobbing of small spur gears may be performed on the Mikron No. 102 universal gear hobbing machine which has been introduced into this country by the above company. The machine has a capacity for hobbing straight spur and helical gears and pinions up to 5¼ in. in diam. and 5½ in. in length.

Gears may be hobbed with a number of teeth ranging from 6 to 325, having either right- or left-hand spiral angles up to 70 deg. The maximum pitch that can be hobbed is 12 D.P. Change gears permit a variation of feed from 0.004 to 0.030 in. per rev. of the work.

The cutter head can be rotated through an arc of 180 deg. The machine is furnished with micrometer dials. All working parts are hardened and ground. A draw-in spindle for holding work in spring collets is included.

By means of a special attachment the machine can be used for hobbing small bevel gears up to 3 in. in diam. with a bevel angle between 0 and 180 deg. and as coarse as 20 D.P. An oil reservoir with a filtering compartment is contained in the base of the machine.

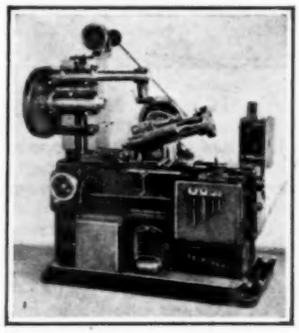
Floor space 2x3 in.; weight with countershaft, 600 pounds.

— 26 —

Gear Cutting Machine, Automatic, No. 13

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol. 68,p.706]

This No. 13 automatic gear cutting machine has been redesigned to increase its capacity and ease of handling. It has



been made heavier throughout so that teeth of 4 D.P. may be cut in cast iron and 5 D.P. in steel. Spur and bevel gears, clutches, segments and other common jobs may be conveniently handled, either as jobbing work or production runs.

The motor is completely inclosed in the base of the machine. Air is admitted to cool the motor through louvers placed at the front and rear of the compartment. Chain drives have slack taken up by adjusting the plate on which the motor is mounted. All parts of the machine may be quickly and easily lubricated.

Weight, 4,000 pounds.

— 27 —

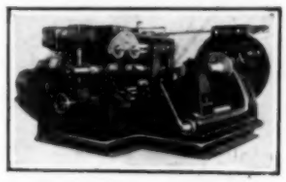
Gear Generator, Improved, Sykes, No. 4A

Farrel-Birmingham Co., Buffalo, N. Y. [Vol.68,p.904]

This machine has many improvements in design over the previous machine, so that continuous-toothed herringbone, single-helical and straight-toothed gears can be cut in less time than formerly. The finish of the teeth is improved, and a greater accuracy of tooth contour and division is obtained. The principle used is that of the generating molding process. Only one set of change wheels is used, with a ratio equal to the ratio of the number of teeth in the cutter to those in the gear being cut, so that complicated calculations are avoided.

The rotation of the cutter and blank is continuously in one direction. The cutters are attached to guides, which may be either straight or helical, depending upon the type of gear to be cut.

This No. 4A machine will cut double-helical gears of either continuous or staggered-tooth



design from 1 to 49 in. in diam., and having a width of face from 1 to 18 in., and from 10 to 1½ D.P. It will generate straight-tooth or single-helical gears up to 10 in. width of face between the limits of diameter and pitch given above. It will also cut cluster gears, having different numbers of teeth simultaneously.

The bed of the machine is similar to that of the previous model, but the work saddle ways are extended forward. The back of the work saddle has been raised and the bracket supporting the work mandrel is seated on raised V-ways, radial to the gear cutter. The bracket supporting the outer end of the mandrel is bored to a semi-circular form, so that pinions with large extended shafts up to 9 in. in diam. can be fitted in bushings and held rigidly.

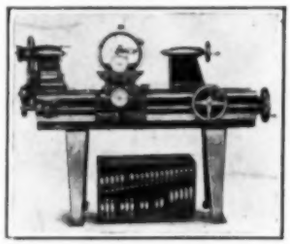
The cutter brackets are heavier than on the previous machine, and two locking screws instead of one are used. An important feature is adjustable supports for the wheel blank.

— 28 —

Testing Machine, Hob and Worm, Universal

Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. [Vol. 68,p.1068]

Accurate testing of all the important elements in hobs and worms can be accomplished by this universal testing machine which is intended for work up to 15 in. in diam. and 30 in. in length, but will swing objects of special shape whose weight



is not in proportion to the bulk, up to 20 in. in diam. and 40 in. between centers.

The complete machine consists of a bed, headstock with spindle, tailstock, carriage, lead screw and change gears to interconnect the spindle and the lead screw. On the carriage is a universal testing head. The machine is arranged to test the lead, the pressure angle, and the contour of the teeth in both straight- and helically-fluted hobs, and of corresponding parts of worm threads. It will also test the concentricity of the relief clearance of the hob teeth, and the spacing of threads or starts in multiple-threaded hobs and worms.

A set of change gears is provided to cover the lead of common pitches and gear hobs.

Weight, 2,300 pounds.

Grinding Machines

— 29 —

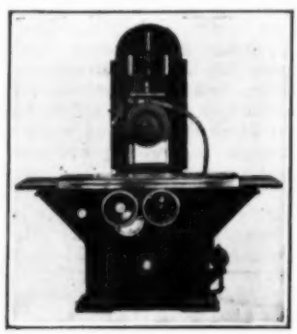
Grinder, Surface, No. 3

Reid Bros. Co., Beverly, Mass. [Vol.68,p.1023]

This complete unit requires no countershaft as it can be belted directly to the main drive shaft. A change from belt to motor drive can be effected at any time.

The bed and column are cast in one piece. The box-type head fits inside the housing of the column. From the countershaft in the base an endless belt drives the spindle at 1,680 r.p.m. The spindle is 32 in. long, hardened, ground and notched, and has phosphor-bronze tapered bearings. Control of the head is effected by a handwheel graduated to one-half thousandths of an inch. One full turn of the wheel raises and lowers the head 0.1 inch.

The machine has a capacity to



grind work 32 in. long, 12 in. wide, and 12 in. high, under a 12-in. wheel, and in addition, will grind pieces of any length up to 4 in. wide and 10 in. high crosswise by passing them through the opening in the housing. This opening is 10 in. wide and 11 in. high under the wheel. The grinding is done by wheels 12 in. in diam. having a 1-in. face and a 5-in. hole.

Three speeds are provided for the table which is 50 in. long by 15 in. wide. There are three T-slots running the full length of the table. Automatic table travel in both directions is controlled by dogs. Hand control is also possible.

Weight, 4,000 pounds.

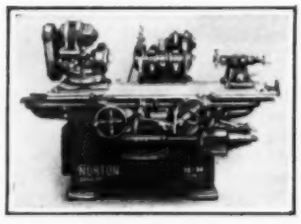
— 30 —

Grinding Machine, Cylindrical, Multi-Purpose, 12x36-Inch

Norton Co., Worcester, Mass. [Vol.68,p.895]

Simplicity of construction and complete integral power control are features of this improved multi-purpose grinding machine. It is designed as an intermediate tool between the tool grinder and heavy production outfit, and its range includes external, internal and face grinding.

Three separate motors drive the headstock, wheel and the



work table and pump. Though essentially a light machine, it is rigidly built and will swing work up to 14 in. in diam. or grind pieces up to 37 in. in length.

Both the headstock and the wheelhead are of the swivel type and are graduated in degrees. Positions on the headstock are provided for face grinding. The wheelhead may be swivelled to an angle of 180 deg., to bring into position the internal grinding spindle which is permanently mounted on the double-ended wheelhead. The headstock is equipped with a chuck which may be attached to the spindle to handle small work which cannot be handled on centers.

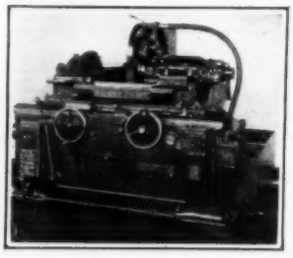
The footstock is of the combination lever and screw type for quick changing of work on centers. A diamond tool holder is also provided. The work table is made in two parts, the top pivoting on a stud in the center for taper work. Eight speeds, ranging from 21 to 111 in. per min. are available. An automatic stop arrests the feed when the work is to size.

— 31 —

Grinding Machines, Plain, Nos. 30, 32 and 33

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol. 68,p.861]

This series of plain grinding machines, Nos. 30, 32 and 33, will take lengths of 18, 36 and 48 in., respectively, between centers. They are made in two



styles: The "A" machine has hand operation for the table, and one power table feed for wheel truing. It is adapted to straight-in-feed grinding, using either power or hand cross feeds. The "B" machine has only hand table and cross feeds. It is used for straight-in-feed grinding by means of hand cross feed only. All of these machines will take objects 12 in. in diam. and will grind them with a 24-in. wheel having faces from 2 to 10 in. in width. A 30-in. wheel having a face from 2 to 6 in. in width can be used to grind work 6 in. in diam.

The combination of a torsion shaft and a belt drive makes the work drive smooth and vibrationless. The wheel stand has the ways protected.

These machines are essentially production units possessing a wide range of table and work feeds. Due to a table dwell, which is provided at each end of the table traverse, and a shock absorber in the reversing mechanism, high table speeds can be used without damaging the finish of the work. All control levers are grouped at the normal operating position.

All main operating mechanisms, including the wheel spindle, are automatically lubricated with filtered oil. Either overhead countershaft drive or motor drive is available. From 15 to 40 hp. is required.

— 32 —

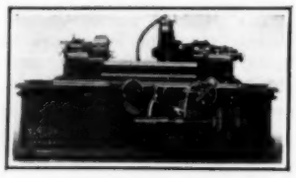
Grinding Machines, Cylindrical, 14x36- to 14x120-Inch, Type BA

Norton Co., Worcester, Mass. [Vol.68,p.1062]

Several sizes of the Type BA cylindrical grinding machine to swing work 14 in. in diam. have been announced by the above company to supplement the Type BA 14x24-in. grinding machine described on page 363, Vol. 67, of the *American Machinist*. The later models are made in standard sizes from 14x36 to 14x120 inches.

Such pieces as car axles and crankshaft bearings are typical of the work for which these machines were designed. Ample space has been provided for work with flanges or other projections up to the full capacity of the machine, and when steady rests are necessary, pieces as large as 6½ in. may be ground.

The improved wheel spindle is simply constructed, and is made from special heat-treated alloy steel. Adjustment of the bearings while the machine is in motion is possible. Flood lubri-



cation is used. Massive construction marks the wheelslide which has long and wide ways. The wheel is advanced to the work by micrometric arrangement of the wheel feed.

The speeds are changed through a selective gear mechanism. All changes can be effected without stopping the table, work, or wheel. An independent device is used for truing the wheel. Either belt or motor drive of the headstock is available. Power is transmitted to the drive plate through a silent chain provided with an idler.

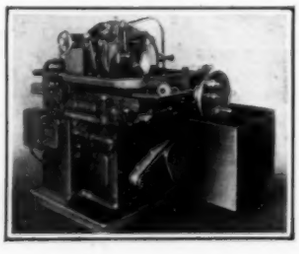
Either screw or lever types of footstocks are supplied with the machine, but for special work air- or crank-operated styles are available. All models are equipped with a large spindle and center.

— 33 —

Grinder, Internal, "Hydro-matic," No. 12

Greenfield Tap and Die Corporation, Greenfield, Mass. [Vol. 68,p.551]

High production, accuracy, safety and compactness are the main features of this internal grinder. Contrary to standard practice, the grinding wheel in



this machine enters the work from the rear, instead of from the front. The workhead is reciprocated by means of oil under pressure so that a wide range of table feeds is available.

The grinding wheel is at no time exposed, hence it is impossible for the operator to come in contact with it. Another advantage is that the coolant floods the work and the diamond truing device at all times, thus maintaining a constant temperature.

Automatic action of the feed screw, which is governed by a cam, is so arranged that successive strokes of the table result in progressively diminishing increments of feed for roughing cuts. After these have been taken, the movement of a lever causes the diamond to trim the wheel, in preparation for the finishing cuts. The increments of these final cuts are governed by the positive action of the cam. The diamond is fixed at all times.

Misalignment is minimized by the fact that the work is practically inside of the bearing, so the machine is claimed to grind within limits of 0.0002 to 0.0003 in. The machine is regularly furnished with one workhead feed. Ball bearings are used throughout on all revolving parts. The capacity of the machine is for holes ¾ to 3 in. in diam. and up to 4 in. depth. The workhead can be swiveled for taper grinding.

Floor space 42½x73 in.; weight, 5,500 pounds.

— 34 —

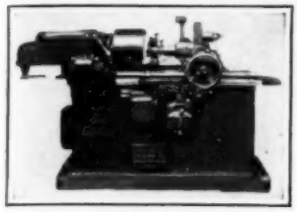
Grinding Machine, Internal, "Gage-Matic"

Heald Machine Co., Worcester, Mass. [Vol.68,p.863]

Combining the principle of its regular "Size-Matic" internal grinding machine with that of the "Tero-Matic" recently acquired by it from the Giddings & Lewis Machine Tool Co., the above company has brought out the "Gage-Matic" to grind the bores of small parts such as gears, rings for ball bearings, and bushings.

The base and the wheelslide of the machine are those of the "Size-Matic" but have minor changes in the feed mechanism. The workhead embodies the principles of the "Tero-Matic" in that it gages the size of the hole being ground by means of a positive plug gage, and indicates the moment of withdrawing the wheel and automatically stops the machine upon completion of the work.

This grinding machine is self-contained, carrying the hydraulic pumps to drive the reciprocating mechanism, supply cooling compound to the wheel and work, and an electric generator to supply current to operate the



electric controls. It may be driven by belt from a countershaft or provided with either two or three motors. In either case the grinding wheel spindle is driven by a separate electric motor.

The work spindle carries a 9¼-in. flange for the attachment of various fixtures. The spindle is carried upon ball bearings, and the belt pull is carried separately. Easy adjustment of the movement of the wheelslide is obtained by means of movable dogs on the table. The rate of reciprocation is controllable from 0 to 44 ft. per min. Cross-movement of the wheel can be made in increments of 0.0001 in. and larger. The wheelslide moves on one flat- and one V-way, fully covered, and pressure lubricated.

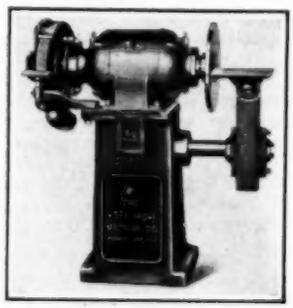
The machine will swing work 15⅜ in. in diam. over the table and 11½ in. inside the standard water guard. It has a capacity to grind holes 5 in. in diam. in any length up to 8¾ in.

— 35 —

Grinder, Combination Disk and Floor Stand Type, "Hisey"

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.68,p.354]

This 3½-hp. combination disk and floor-stand grinder is designed to carry a grinding wheel 14 in. in diam. by 2½-in. face, and a disk grinder 15 in. in



diam. A plain worktable 8¼x9½ in. is furnished as standard equipment, but a universal lever feed table 6½x13 in. is available.

The spindle is made of special alloy steel, and is mounted on annular ball bearings. Thrust is taken by a double-acting, self-aligning thrust bearing. The unit is regularly provided for use on 220- and 440-volt, 3-phase, 60-cycle a.c. or 115- and 230-volt d.c., but special motors can be supplied.

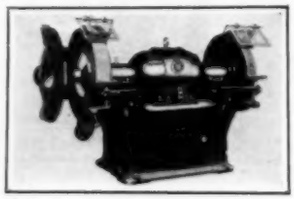
— 36 —

Grinders, Floor Stand

Cincinnati Electrical Tool Co., Cincinnati, Ohio. [Vol.68,p.439]

These heavy-duty floor grinders, in sizes of 5, 7½ and 10 hp. are intended for foundries, steel mills, railroads and forge shops, and for production work. The motors are fully inclosed, and the spindle is mounted on four Timken roller bearings running in oil and protected from dust and dirt.

The wheel guards are of cast steel, are equipped with exhaust connections and have a 4-in. ad-



justment to take care of wheel wear. Non-breakable adjustable eye shields as well as chip breakers are also provided over each grinding wheel.

The one-piece spindle is of nickel alloy steel ground to size. The wheel flanges and nuts are machined to be in balance with the spindle to minimize vibration. The wheels for these grinders have a 12-in. bore.

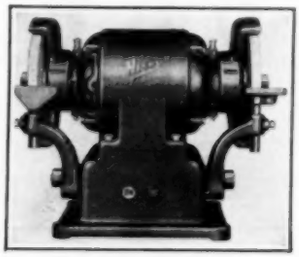
The starter is of the safety type fully inclosed with both overload and undervoltage protection. It is mounted in the base. A push-button control station is conveniently mounted on the motor frame. These grinders can be had for a.c. of 220, 440 and 550 volts, 2- or 3-phase, and for d.c. of 115 or 230 volts.

— 37 —

Grinder, Bench, Two-Wheel, 6-Inch "Hisey"

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.68,p.706]

This bench grinder will take wheels up to 6 in. in diam., and is equipped with adjustable grinding rests which can be re-



moved. The spindle bearings are completely inclosed, and are provided with felt washers for protection against dust.

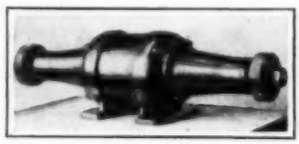
As will be noted in the illustration, the motor switch is inclosed in the base and is actuated by a push-button, which protrudes through the wall. A ¾-hp. motor is used.

— 38 —

Grinder, High-Speed, No. 204

Forbes & Myers, 172 Union St., Worcester, Mass. [Vol.68, p.864]

This grinder is designed to operate from a 180-cycle source, with a speed of 5,400 r.p.m.



The machine is of the double-ended type and carries a 4-in. wheel mounted directly on the motor shaft as shown. It is driven by a ¾-hp. motor running in four ball bearings.

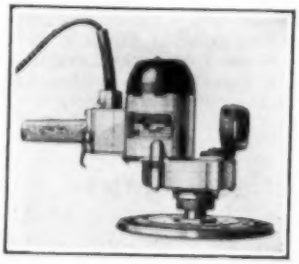
Other grinders running at speeds of 3,600 to 12,000 r.p.m. are offered to drive wheels from 1 to 6 in. in diameter.

— 39 —

Grinder, Surface, Portable, Electric, "Flex-Disc"

Van Dorn Electric Tool Co., Cleveland, Ohio. [Vol.68,p.438]

Ample power and compact design are the main features of this portable grinding and sanding machine that will surface both metal and wood. The motor and general construction are the same as that embodied in standard Van Dorn drills. The motor has a no-load speed of



2,400 r.p.m., and can be operated on either alternating or direct current.

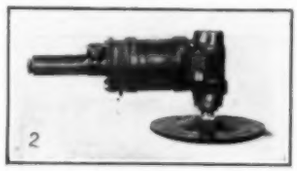
The machine is equipped with a 9-in. flexible rubber pad which serves as a base for 9¼-in. abrasive disks. This flexible disk feature makes possible grinding or sanding on curved surfaces. A heavy felt pad may be substituted for the rubber pad for lacquer polishing. The grinder can be furnished for use on 110-, 220- or 250-volt circuits. Five removable cloth bonnets are supplied with each pad.

— 40 —

Grinders and Sanders, Rotary, Air-Driven, "Thor"

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. [Vol.68,p.476]

The outstanding features of this line are the balanced motor, governor, lubricator and muffler. The governor, which is adjustable, keeps the free speed and air consumption low until the wheel is applied to the work and then adjusts itself auto-



matically to the volume required. The automatic oiler carries sufficient lubricant to last 8 hours.

The "Thor" No. 271 grinder weighs 15½ lb. and is 21¼ in. long. The speed is 4,000 r.p.m. It carries a 6-in. emery wheel, 1½ in. across the face. The No. 272 grinder weighs 17¼ lb. and is 19¾ in. long. The speed is 3,200 r.p.m. It carries an 8-in. emery wheel, 1½ in. across the face.

The Thor 271R sander has an over-all length of 14 in. The speed is 4,000 r.p.m. It carries flexible disks up to and including 9 in. in diameter.

— 41 —

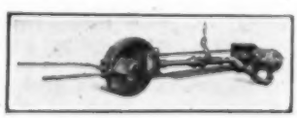
Grinder, Swing-Frame, 24-Inch

Norton Co., Worcester, Mass. [Vol.68,p.552]

The development of Bakelite-bonded grinding wheels has caused the development of this swing-frame grinding machine for snagging operations. The machine, which is of the suspended type, weighs only 850 lb. and is balanced both laterally and rotatively.

The duplex sheave on the motor is so arranged that either 24- or 20-in. diam. wheels can be operated at 9,000 ft. per min. Wheels may have either 2 or 3 in. face, and either 8- or 12-in. holes can be accommodated.

Wheel changes are made



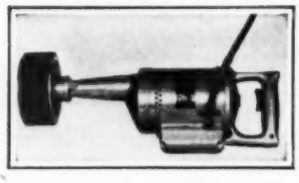
quickly on this machine. A toggle arrangement on the motor releases the V belts after which a single bolt is removed and the wheelhead dropped to the floor. These grinders are driven by a ball-bearing, 10-hp. motor designed for grinding duty, and suitable for a.c. installations. Control is by push-button on the wheel guard.

— 42 —

Grinder, Portable, and "Jiffy" Sander

Jas. Clark, Jr., Electric Co., Louisville, Ky. [Vol.68,p.896]

Grinding, sanding, hand buffing, wire brushing, disk sanding, and saw gumming may be performed with this portable grinder. The machine has a ventilated housing made from



aluminum alloy. The motor has a 40-deg. rating and is mounted in ball bearings. All gears are made from special alloy steel, heat-treated.

An automatic double-pole switch with a locking device controls the current. The grinder is supplied in three sizes Nos. 00, 0, and 1, which gives speeds of 5,000, 4,000, and 3,000 r.p.m., respectively.

The "Jiffy" sanding wheel consists of two clamps constructed of aluminum alloy and machined so that when clamped together the filler and abrasive bands form a true cutting surface. The rubber filler bands are flexible, but will not expand nor puncture. They are made in widths of 1½, 2, and 3 in. for wheels of 4-, 5-, and 6-in. diam. The abrasive bands are made of endless linen cloth coated with various grits.

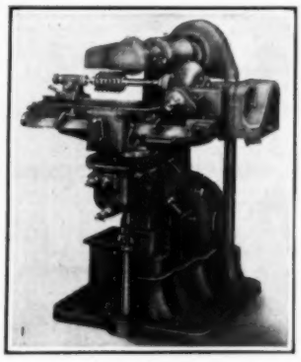
— 43 —

Hob and Cutter Sharpening Machines, Pfauter, Nos. FS 1 and FS a1

O. Zernickow Co., 15 Park Row, New York City, New York. [Vol.68,p.707]

These Pfauter Nos. FS 1 and FS a1 hob and cutter sharpening machines will grind spiral-fluted milling cutters from the smallest size up to 6¼ in. in diam. and 10¾ in. maximum grinding length. They are also adapted to grind hobs, form cutters, cylindrical cutters and reamers.

Both machines have several features in common. Either sin-



gle pulley or direct motor drive may be obtained. Automatic table travel is provided by a reversing device operated by two adjustable stops on the table, and the machines grind on both the forward and on the return movements. The table of the machine runs on wide ways, and the cross-slide and table are arranged to swivel to an angle of 35 deg. The grinding wheel spindle is hardened and ground and runs in adjustable dust-proof phosphor-bronze bearings.

The manner in which the work is indexed constitutes the difference between the two machines. However, in either machine positive rotation of the cutter corresponding to the spiral grinding flute is accomplished by means of a system of change gears. The semi-automatic machine employs hand indexing from flute to flute and the work must be set up after each stroke of the table. On the fully-automatic machine, however, a second set of change gears governs the indexing. The indexing takes place automatically after every forward and return stroke of the table, and the feed is adjustable according to requirements.

A 2-hp. motor drives the grinding wheel spindle at 3,400 r.p.m. The maximum diameter of the grinding wheel is 5¾ in.

Floor space, either machine, 63x63 in.; weight 2,000 pounds.

— 44 —

Grinder, Cutter

Ingersoll Milling Machine Co., Rockford, Ill. [Vol.68, p.829]

Milling cutters may be ground in a single setting on this cutter grinder which performs the operation dry so that it is always visible due to the open construction. Cutters from 5 to 30 in. in diam. can be handled that have faces from ¼ to 7 in. in width. The cutters may be ground square, at an angle, or with any radius up to 2¼ in. Cutters with solid shanks may be ground since the cutter spindle is fitted to hold an Ingersoll "M" taper shank 3¼ in. in diam. by 10¾ in. long.

A horizontal adjustment of 15 in. is provided by the spindle saddle while the spindle quill has a 4-in. vertical adjustment. These movements are made by means of graduated handwheels located at the front of the machine. The grinding-wheel spindle is mounted in a U-shaped yoke pivoted about the

horizontal axis through a range of 96 deg. The yoke is mounted on anti-friction bearings.

The motor is built into the wheel side from whence it drives the spindle through an internal reduction gear cut on the end. Either a.c. or d.c. motors are available for this machine.

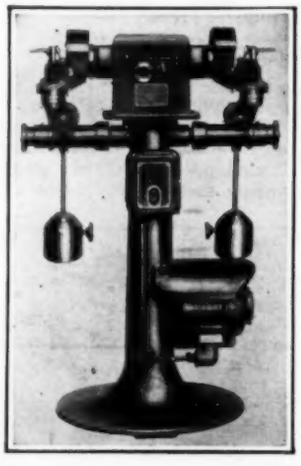
Weight 1,650 pounds.

— 45 —

Grinder, Tool, Improved, for Gear Generator

Gleason Works, Rochester, N. Y. [Vol.68,p.948]

Tools for any of the Gleason straight bevel gear generators and the 60-in. spiral-bevel gear planing generator may be sharpened on this improved tool grinder. The machine is



equipped with two grinding wheels, the upper tools being sharpened on one wheel and the lower ones on the other. The grinding is against the cutting edge of the tools to prevent burning of the edges. Tools can be ground to any side and front rake.

The wheel spindle runs in precision ball bearings. One main oil cup supplies oil to the spindle and bearings, and can be checked through an oil sight feed. Standard machines are belt driven, but they can be arranged for motor drive. A ¾-hp. constant-speed motor is required.

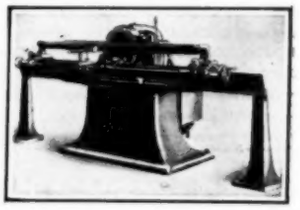
Floor space 18x21 in.; weight, 375 pounds.

— 46 —

Grinder, Knife, Full-Automatic, Type R

Samuel C. Rogers & Co., 191 Dutton Ave., Buffalo, N. Y. [Vol.68,p.75]

Chipper, veneer, paper, and shear blades up to 146 in. in length can be ground accurately and speedily on this Type R full-automatic grinder. The grinding is performed by a 14-in. sectional grinding wheel having eight segments mounted on a strong steel chuck. In con-



junction with an improved water attachment, the spring cross-feed, and the type of grinding wheel used are features that permit fast grinding without danger of burning the knives, it is claimed.

The spindle, which may be mounted on ball bearings if desired, is belt driven direct from a 5-hp. motor built into the base. Other features of the unit are the heavy yoke bottom supports with adjusting nut to eliminate vibration and the double ratchet feeding with automatic stop. The machine is made in eight sizes ranging from 76 to 144 in. in capacity. The overall floor space varies from 4 ft.x14 ft. 2 in. to 4x26 ft., and the domestic shipping weights vary from 2,450 to 3,900 pounds.

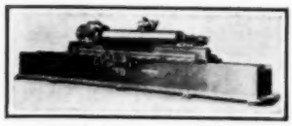
— 47 —

Grinder, Roll, Self-contained, 24-Inch

Cincinnati Grinders Incorporated, Cincinnati, Ohio. [Vol. 68,p.192]

This machine is built in thirteen different length capacities from 48 to 336 in., in increments of 24 in. All the standard machines are built with sin-

gle tables. Machines up to 144 in. with free centers, however, have been designed with two tables, an upper work or swivel table, and a lower sliding table. This construction allows tapers to be ground. On single table machines, a set-over construction in the footstock takes care of any misalignment between work centers and insures the



parallel grinding. Oil is distributed through oil grooves cut in the underside of the sliding table.

The wheelhead is very heavy in design, and is mounted on large V- and flat-ways. A 30-hp. motor drives the spindle through a multiple-strand Texrope drive. The wheelhead is balanced with a large counterweight insuring smooth infeeding and accurate sizing.

The grinding wheel spindle is mounted in half bearings of special bronze alloy, and is automatically lubricated. The spindle is made from a chrome-nickel forging, heat-treated and ground and will carry a 12-in. wheel.

All of the twelve table traverse speeds are obtained through the use of hardened-steel sliding gears mounted on multiple-splined shafts. All control levers are conveniently placed. The motor-driven headstock is controlled by a rheostat and has dynamic braking.

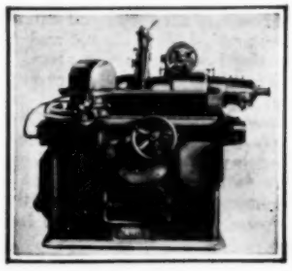
The driving plate has a speed range of 11 to 96 r.p.m. The work headstock is of the dead-center type. Where d.c. is not available, a 3½-kw. d.c. generator is built into the machine.

— 48 —

Grinder, Face, Hydraulic Valve, Semi-Automatic

Landis Tool Co., Waynesboro, Pa. [Vol.68,p.392]

This machine has the work carriage, workhead and cross-slide designed especially for grinding valve faces. The live-spindle workhead is mounted at an angle of 45 deg. on a cross-slide which moves at right angles to the axis of the grinding wheel. The crossslide is



actuated by hydraulic power operating through a piston at the rear of the head. A ½-hp., constant-speed motor mounted on the head drives the work spindle through a silent chain and sprocket. Movement of the head regulates automatically the rotation of the spindle.

The grinding-wheel head is equipped with a special alloy steel spindle running in bronze cap bearings, pressure lubricated. A 24x1x8-in. wheel is used. A reciprocating-type wheel spindle is furnished, so as to eliminate wheel marks on the work. The equipment includes a standard 6-in. plain, hydraulic wheel-truing fixture. Power for the workhead feed is furnished by a geared oil pump driven from the rear drive shaft.

The machine may be arranged for either belt- or direct-motor drive. A 5-hp. motor is required.

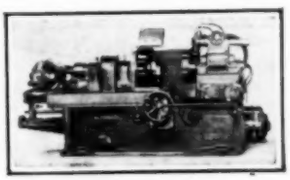
— 49 —

Grinder, Brake Drum, Duplex

Cincinnati Grinders Incorporated, Cincinnati, Ohio. [Vol. 68,p.899]

This grinder has been introduced for simultaneously grinding the internal and external diameters of hardened steel brake drums. It is a high production machine, and attention has been given to ease of operation, rigidity, and power requirements.

All of the major operations are accomplished by air pressure. The machine illustrated



is designed for grinding the drums mounted on the hubs. The workhead is driven by a 3-hp. variable-speed d.c. motor, having push-button control. The power is transmitted through a multiple-strand Texrope drive to a heavy worm and worm-wheel keyed to the workhead spindle. A speed variation of from 1 to 44 r.p.m. is available.

A permanently located stop acts on the air valve to facilitate rapid positioning in relation to the grinding wheels. In addition, hand control is possible. Reciprocation of the workhead is automatic.

The machine is equipped with two independently driven and operated wheelheads. The driving motors are semi-inclosed in the bed of the machine. The wheel spindles are heavy and tend to reduce vibration to a minimum. Automatic lubrication is provided by means of centrifugal slingers on the spindles. The feed movement of the heads is independently controlled and adjusted by two handwheels in conjunction with positive stops.

The front spindle carries a 14-in. wheel for internal grinding and the rear spindle a 20-in. wheel for external grinding. Both are counterbored alike and arranged so that when worn down the large wheel can be transferred to the internal grinding spindle. Wheel-truing devices are mounted on the wheelhead.

Coolant is supplied from a tank built into the bed of the machine by an independent gusher pump. On test, this machine ground 30 hardened steel brake drums per hour.

— 50 —

Grinder, Rod, Size 63

Ingersoll-Rand Co., 11 Broadway, New York, N. Y. [Vol. 68,p.910]

Several types of work are included in the scope of this rod grinder which takes a 6-in. grinding wheel, and is provided with an outboard bearing and hand grip. The machine was designed primarily for grinding

locomotive side and main rods. Its compact and light construction and its wide-faced wheel, however, make it suitable for grinding many wide surfaces.

The motor of this air-driven grinder has three cylinders, all delivering power to one crank pin. Each of the three cast-iron cylinders is separate from the aluminum case and each is interchangeable. The valve, crank, and spindle are made in one piece. Three sets of ball bearings support the crank spindle.

Grinding wheels for this machine have a 6-in. face, a $\frac{5}{16}$-in. arbor hole and a diameter of 2½ in. The wheels are made in two grits and grades. The average free speed is 6,000 r.p.m.

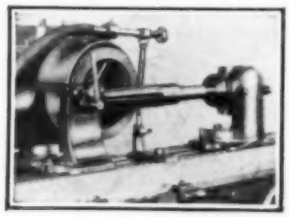
Overall length, 23¾ in.; weight, 16¼ pounds.

— 51 —

Holder, Cutter and Reamer

Thomson Grinder Co., Springfield, Ohio. [Vol.68,p.398]

An improved cutter and reamer holder with tailstock is now included with the equipment of the standard 12x36-in. universal grinding machine made by the above company. The unit has a capacity for milling



cutters up to 12 in. in diam., straight or spiral teeth. It can be swivelled through a vertical plane, and also through a horizontal plane, and is used with a cup wheel so that straight angle clearance can be obtained on the cutter teeth.

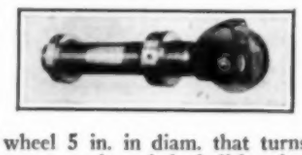
When reamers are to be ground on centers, a special tailstock is used. It has a capacity for reamers 1½ to 12 in. in diam., and 36 in. long. The tailstock is designed to permit the free passage of the cup wheel without interference on even the smallest reamers. A quick-acting movement is provided to the center, and quick-action clamp for locking it in position. The headstock is fitted with the standard taper hole adopted for milling machines, and can be bushed for taper- or straight-shanks.

— 52 —

Truing Tool, "Master"

Ross Manufacturing Co., Cleveland, Ohio. [Vol.68,p.673]

This truing tool which is intended for use with the Nos. 2, 3 and 4 Cincinnati centerless grinders employs an abrasive



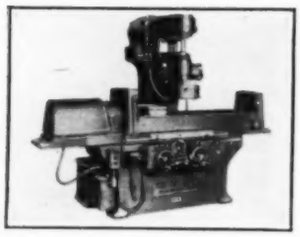
wheel 5 in. in diam. that turns on a grit-sealed ball-bearing spindle. The shank of the tool fits into the slide of the grinder, and is keyed to the slide holding the truing wheel. The tool is fed against the grinding wheel by means of two threaded collars.

— 53 —

Chuck, Rotary, for Surface Grinder, Vertical-Spindle

Pratt & Whitney Co., Hartford, Conn. [Vol.68,p.713]

This power-driven rotary chuck is to be attached to the traversing table of the 16-in. vertical-spindle surface-grinding machine manufactured by the above company so that it may be converted temporarily into a rotary surface grinder. The chuck is an entirely self-contained unit, and is attached to the end of the regular ma-



chine table. No change in the machine is necessary except to remove the water guard.

The chuck is driven by a variable-speed motor through a worm and wormwheel. A control box provides a means of obtaining the desired range of rotative speeds. The chuck may be furnished in either the mechanical or magnetic type.

— 54 —

Grinding Attachment, Flexible Shaft, High-Speed

N. A. Strand & Co., 5001 N. Lincoln St., Chicago, Ill. [Vol. 69,p.1027]

This high-speed flexible shaft attachment for operating small grinding wheels is in reality a compound pulley drive. The device is interchangeable with the No. 4 or 5 flexible-shaft

grinding machines manufactured by the above company. It is constructed with ball bearings throughout and can be attached in less than one minute.

Ball bearing wheels up to 2-in. in diam. may be operated at 10,000 r.p.m. by means of this device. A ball bearing hand piece with ¼ in. collet or regular ball bearing hand spindle is also furnished.

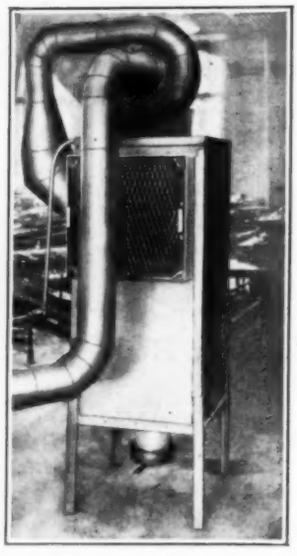
— 55 —

Filters for Grinding Machinery

Midwest Air Filters, Inc., Bradford, Pa. [Vol.68,p.1070]

Air discharged from grinding machines may be cleaned by the type U-2 air filter. The filter is incorporated in a dust-collecting cabinet having a centrifugal fan mounted thereon and sucking the dust-laden air from either the individual machine or small batteries of grinders.

The advantages claimed for the equipment are: since the machine is mounted indoors, recirculation of air effects econo-



mies in heating; low cost of installation due to compact arrangement and short run of ducts; indestructible filtering medium permits long service; low operating expense due to low suction required; high dust capacity, and the panels can be washed in ordinary cleaning compounds.

For light work, a 9-unit filter will handle from 15 to 20 small wheels, maintain suction of 3 in., water gage, and remove air at 300 to 350 ft. per min. Velocity on heavy work—200 ft. per minute.

— 56 —

Grinding Wheel, Internal

Carborundum Co., Niagara Falls, N. Y. [Vol.68,p.791]

Elimination of bell-mouthed holes is made possible by this internal grinding wheel which has the arbor hole placed in the exact center of the wheel, thus insuring concentricity of the

hole and the grinding surface. Accurate fitting to the arbor is secured because the arbor hole is finished to within minute limits of accuracy. Holes can be ground which will be cylindrical to the bottom and not dished, because the edges of the wheel are claimed to hold their shape.

— 57 —

Grinding Wheels, Large Diameter, Aloxite

Carborundum Co., Niagara Falls, N. Y. [Vol.68,p.862]

These vitrified Aloxite abrasive wheels of extra large diameter are designed for grinding of automotive crankpins and crank bearings, and are made in 36 and 42 in. diam. The 36-in. wheels can be furnished in thicknesses down to 1¾ in., and the 42 in. wheels in thicknesses down to 1¼ in. The wheels are made to accurate dimensions, with perfect balance, and are adapted to all standard machines.

They will finish a great number of pieces with slight wear.

— 58 —

Grinding Wheel, "Super-Speed"

Carborundum Co., Niagara Falls, N. Y. [Vol.68,p.867]

This "super-speed" grinding wheel which is recommended especially for snagging operations, is made of Aloxite aluminous abrasive bonded with Redmanol, a synthetic phenol resin which acts as a tough, tenacious bonding agent. Safe and efficient operation at 9,000 surface feet per min.

The super-speed wheels are stated to be open, porous, extremely free-cutting, and of great durability. Wheels with arbors of 5 in. diam. or larger are fitted with one or two steel protection rings.

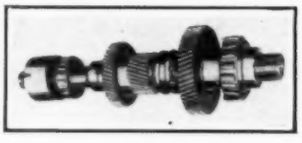
Lathes

— 59 —

Lathes with Timken Roller Bearing Spindles

Monarch Machine Tool Co., Sidney, Ohio. [Vol.68,p.37]

Monarch lathes are now offered with the spindles mounted in precision-type Timken roller bearings as optional equipment.



This feature is applied to the entire line equipped with heads having helical gears in sizes from 14 to 30 in. inclusive.

In mounting the bearings, an initial thrust load is imposed to remove any radial or end movement of the spindle. Means of adjustment is provided for the bearing. Clean, filtered oil is supplied to both spindle bearings. Ease of replacement simplifies maintenance.

— 60 —

Lathe, Engine, Heavy, Improved

Niles Tool Works Co., Division Niles-Bement-Pond Co., Hamilton, Ohio. [Vol.68,p.196]

Many improvements, chiefly in the headstock and carriage, are noted in this line of engine lathes made in capacities from 36- to 60-in. swing, and in bed lengths up to 32 ft. The main spindle bearing dimensions have been increased about 40 per cent, and the other parts correspondingly. All gears in the head are now of steel.

In the lower half of the headstock there are four mechanical changes of speed obtainable for either a.c. or d.c. drive, which, in conjunction with the variation in motor speeds for d.c. drive, gives faceplate speeds ranging from 1.9 to 231 r.p.m. For a.c. drive, the top half of the box has, in addition, 6 mechanical changes, making 24 changes in all, ranging from 1.5 to 169.5 r.p.m. Direct drive to the spindle is made through a large gear next to the front bearing.

All gears and bearings in the head are supplied with forced lubrication. With d.c. drive, the faceplate is quickly stopped by dynamic braking. A jog push-button in the headstock facilitates gear shifting.

The carriage is supported on a bed on V-tracks, and the

bridge has a flat bearing on the inner edge of the front shear, directly under the tool. The carriage can be securely clamped in position when cross-feeding. Provision is made for angular feed which may be supplied as an additional feature on the 36- and 42-in. sizes, but is regular equipment on the larger sizes. Power rapid traverse of the carriage is also optional on the 36- and 42-in. sizes, and is standard on the larger sizes.

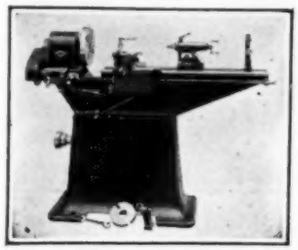
The apron is a one-piece casting. Four speed changes are engaged and reversed by sliding gears and positive tooth clutches. The lead screw is splined for the full length and drives a double fine-tooth clutch that engages either one of two beveled gears.

— 61 —

Lathes, "Junior" and "Master"

Artisan Manufacturing Co., Cincinnati, Ohio. [Vol.68,p.555]

These machines are equipped with standard features of the line such as headstock, tailstock, screw and screw-cutting units. Because of these interchangeable features, these machines



may be equipped with either plain or compound-rest, hand feed and either loose or quick-change gears.

The "Junior" lathe is motor driven through a countershaft mounted on a shelf cast integral with the bed. The distance between centers is 18 in. It requires a ¼-hp. motor, and has a swing of 11 inches.

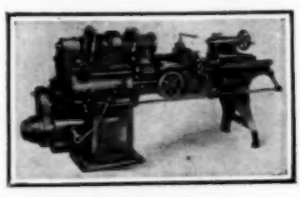
The "Master" lathe is driven through a countershaft that forms a part of the machine whether belt or motor driven, and is mounted at the rear of the machine. The motor is mounted on a sliding base which takes up any belt stretch. The machine is built with 11-in. swing and has a distance of 36 in. between centers.

— 62 —

Lathe, Multi-Speed

Chard Lathe Co., Newcastle, Ind. [Vol.68,p.239]

A gear box on the leg through which the four highest speeds of the spindle can be obtained without the use of any gear in the headstock is featured in this multi-speed lathe. Eight additional speeds are obtainable



through the use of the headstock in conjunction with the gear box.

The lathe can be operated either direct from the lineshaft or by means of a built-in motor. Power is transmitted from the motor to the gear box by means of a silent chain and from the gear box to the spindle by a wide belt. All gears are hardened and all shafts run in ball bearings in a bath of oil.

Three changes of speed are available in the headstock, two through back gears and one direct to the spindle, giving twelve spindle speeds in all. On the pulley sleeve are keyed two gears connected to the backshaft gears.

— 63 —

Lathes, Geared-Head, Improved

Cincinnati Lathe & Tool Co., Oakley, Cincinnati, Ohio. [Vol. 68,p.355]

Any suitable size of a.c. or d.c. motor can be accommodated inside the legs of these lathes, and either silent chain or belt drive may be used. The

lathes are built in 16-, 18-, and 20-in. sizes, with 2-ft. steps of bed lengths.

The lathes feature a patented quick-change gearbox providing a large range of threads and feeds. Twelve spindle speeds are available. All of the gears and shafts in the head are made of manganese chrome alloy steel, heat-treated and ground.

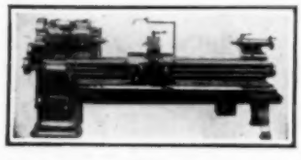
The clutch is of the compression-disk type.

— 64 —

Lathe, Production, Improved

Springfield Machine Tool Co., Springfield, Ohio. [Vol.68,p. 393]

The regular Springfield headstock design, with all ball bearings and all gears drop-forged, heat-treated, and running in oil, is retained. An instantaneous feed box is used, giving six changes of feed for each setting of the change gears. In place of the lead screw, a power rapid-traverse screw is employed. In the rear of the ma-



chine is mounted a taper attachment and oil pump.

The turret toolpost shown can be interchanged with any other type of tool rest. The spindle is mounted on precision-type Timken roller bearings for all sizes. The thrust is taken up on the front bearing with ample adjustment to eliminate chatter on production work.

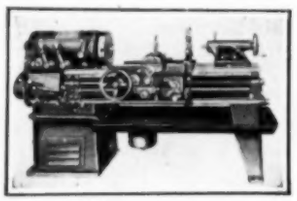
— 65 —

Lathe, Geared-Head, Heavy-Duty, 14- and 16-Inch

Reed-Prentice Corporation, Worcester, Mass. [Vol.68,p. 896]

Two sizes of geared-head lathes are available to swing work 14 and 16 in. in diam., respectively. Various lengths of bed are obtainable. The model shown has a 6-ft. bed to take work 31½ in. long between centers.

A 3-hp. electric motor in the cabinet leg is mounted upon a



hinged bracket that eliminates slack belts. Power is delivered to a constant-speed pulley mounted upon the first shaft of the headstock and engaging through a double "Twin Disc" clutch.

Eight changes of speed ranging from 18 to 432 r.p.m., in geometric progression are available. Selection is made by means of three interlocking levers on the front of the headstock. The gears in the driving train are of chrome-nickel, heat-treated steel and slide on heat-treated, nickel-chromium steel, splined shafts. All gear shafts in the head are carried on ball bearings.

Heat-treated, chrome-nickel steel is used for the spindle which is carried on two pairs of Timken roller bearings. The through hole is 1⅛ in. in diam. The tailstock is of set-over construction to permit the turning of tapers.

Manganese-alloy steel gears in the inclosed quick-change gear box provide 41 changes of feeds and threads, ranging from 0.0035 to 0.112 in. per rev. of the spindle, and from 3 to 96 pitch, respectively.

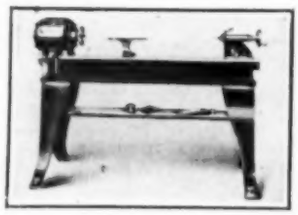
The apron is of box construction. A cross-slide having a compound rest adjustable to any angle, is provided. Both the 14- and 16-in. machines occupy floor space of 40x84 in. Net weight, 2,450 and 2,675 lb., respectively.

— 66 —

Lathe, Speed, Motor-in-Head, "Union"

Gallmeyer & Livingston Co., Grand Rapids, Mich. [Vol.68, p.557]

Three sizes of these speed lathes, with the motor built into the head may be equipped with



one-, two- or three-phase, a.c., or 115- or 230-volt d.c. ½-hp. ball-bearing motors. The spindle speeds may be either 1,725 or 3,450 r.p.m. The motors are made with interchangeable bases, so that the spindle may be driven with high or low speeds.

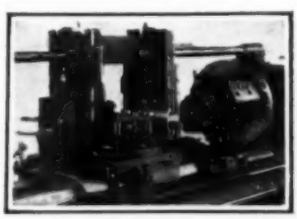
The beds for these three sizes of lathes are 4 ft. 2 in., 5 ft. 4 in. and 6 ft. 4 in. long, respectively, and machined the entire length. The machines will swing work 26, 40 and 52 in. long, respectively, between centers. The height to the top of the bed is 36 in., and from the bed to the center is 6 in. The machines will handle work up to 12 in. in diam. over the bed and up to 9½ in. over the tool rest.

— 67 —

Lathe, Turret, Bottle-Mold, "Cincinnati-Acme"

Acme Machine Tool Co., Cincinnati, Ohio. [Vol.68,p.253]

The "Cincinnati-Acme" turret lathes are equipped with special chucks and tooling for machining bottle molds and blanks.



They will turn the body of the blank or mold, face, backface, counterbore and bore the cavities in two operations. The special chuck allows the mold to be positioned for machining successively the cavities in two or three-bottle molds. Forming is accomplished by a boring tool carried in a holder that moves vertically in a slide, the whole being mounted on the top of the turret parallel to one face. The path of the boring tool is controlled by a formed guide bar.

— 68 —

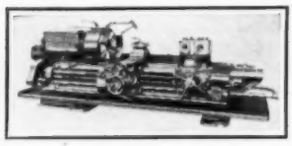
Lathe, Turret, Heavy-Duty, Type "C-H", Libby

International Machine Tool Co., Indianapolis, Ind. [Vol.68, p.989]

This 27-in. heavy-duty turret lathe with a hole 8¼ or 10¼ in. in diam. through the spindle, is

similar in construction to the 29- and 32-in. turret lathes, described on page 711, Vol. 67, of the *American Machinist*.

As in the larger units, the bed and headstock housings are cast in one piece. The headstock is driven direct from the motor through a flexible coupling. All gears in the headstock are of heat-treated alloy steel and are mounted on ball or roller bear-



ings. The main spindle bearings, however, are bronze. Lubrication is effected by means of the splash system.

The turret is provided with a longitudinal feed dial so that work can be conveniently duplicated or the tool fed accurately to any desired length. Rapid traverse for both sides is provided independent of all other feeds. The turret head has a 4¼ in. bore. The machine requires a 25-hp. constant-speed motor for the drive.

The swing of this machine is 27 in. over the ways and 25 in. over the carriage. The traverse of both carriages is 72 in., and the greatest boring depth 23 in. The capacity of the 3-jaw universal chuck is 22¾ inches.

The range of all feeds is ¼ to 1/256 in. per rev., there being ten feeds for the turret and six to the tool post for each change-gear position. Spindle speeds are in geometrical progression from 7 to 162 r.p.m. in eight steps.

Weight, 16,000 pounds.

— 69 —

Lathe, Axle, Center-Drive, Heavy-Duty

Consolidated Machine Tool Corporation of America, Rochester, N. Y. [Vol.68,p.437]

The application of Oilgear feed to the carriages of this machine has eliminated feed gearing and permits the carriages to be handled entirely by power. Pressure is applied to

each tool by oil cylinders attached to the underside of each carriage at the front and back. Any feed up to ½ in. per rev. is available. Power traverse is at the rate of 6 ft. per minute.

Main drive is either by an adjustable-speed motor through a single train of gears or by constant-speed motor through a three-speed gear box. Ordinary requirements call for a 25-hp. motor. The center driving head is equipped with Sykes herringbone gears. The two Oilgear pumps are driven by one 3-hp. constant-speed motor.

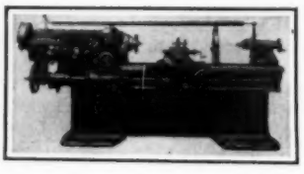
— 70 —

Lathe, Relieving, Universal, Schuttoff

George Scherr Co., 142 Liberty St., New York, N. Y. [Vol.68,p.475]

Many special features are incorporated in the Schuttoff universal relieving lathe being marketed in this country by the above company. All change gears for the lead, helix and the number of gashes are located at the headstock end of the machine. For relieving multiple-thread hobs, a special dividing attachment is provided. Another feature is an automatic trip for disengaging the relieving motion on the return travel of the carriage. A stop is also provided for obtaining the proper and uniform depth of tooth of relieving hobs.

These relieving lathes can be used for the manufacture of re-



lieved milling cutters and similar tools such as spiral and end mills, fly cutters, angular cutters, thread-milling cutters, hobs, taps, reamers and dies. Straight left- or right-hand spiral gashes can be machined. In addition, the machine can be used as an ordinary toolroom lathe. All Whitworth threads from 1/20 to 15 pitch, metric and module threads may be cut. The number of teeth to be relieved may vary between 2 and 40, and the lead of the spiral gashes from 3 to 400 in. The relieving motion may be either left- or right-hand.

A 4-step cone pulley in conjunction with the backgears gives eight spindle speeds ranging from 2½ to 220 r.p.m. The spindle is made of high-grade special steel, hardened and ground. The longitudinal traverse is by change gears and lead screw. The reciprocating motion of the top slide is obtained by interchangeable cams, corresponding to the cutting angle of the tools to be produced. The top slide swivels in a complete circle on a graduated base.

The copying top slide is used for the manufacture of irregular profile cutters with spiral gashes. It is interchangeable with the ordinary top slide.

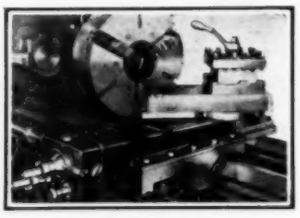
The lathes are made in four models, UHD-3, UHD-3L, UHD-4 and UHD-4L. The first two models have a height to center of 8.8 in., and a distance between centers of 25⅜ and 40 in. respectively. The last two models have a height to center of 10¾ in., and a distance between centers of 29½ and 60 in. respectively. The maximum swing over the saddles is 9¾ in. for the No. 3 machine, and 11¾ in. for the No. 4 machine. The floor space required varies from 30 to 41 sq.ft., and the net weight varies from 4,200 to 6,060 pounds.

— 71 —

Cross-Slide, Compound

Warner & Swasey Co., Cleveland, Ohio. [Vol.68,p.752]

Ease of operation and quick setting to any angle are the principal features of this compound cross-slide that may be used for turning bevel gear



blanks and other work having steep tapers. The device is intended for use on the No. 3A and 4A turret lathes, manufactured by the above company.

The compound cross-slide is of massive construction, and the square turret, carrying the cutters, is made from a solid forging. The Warner & Swasey patented lock-bolt construction is used. The cross-slide may be used as a straight turning and facing slide as well as a compound slide.

Angles can be faced or turned up to the full swing and capacity of the 3A and 4A turret lathes and the swivel plate can be rotated around the entire 360 deg., the full swing stroke of the slide being 8 in. It is also possible to use the standard taper attachment with this slide. A power-feed knock-off is operated in the same manner as on the standard slide.

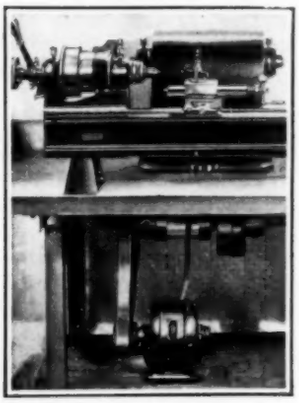
Both the cross- and compound-slides have power feed, the construction and arrangement of them being such that it is impossible to engage both simultaneously.

— 72 —

Lathe Drive, Belt, Horizontal

Rivett Lathe and Grinder Corporation, Boston, Mass. [Vol.68,p.865]

The foundation of this horizontal bench lathe drive is the heavily-ribbed countershaft base. A countershaft bracket is bolted to the base and a fulcrum rod extends from it to the sides of the cast-iron bench guard. A rod, carrying adjusting nuts



which bear against the front face of the bench guard, provides a means for tilting the base to tighten the horizontal belt driving the lathe headstock and also the motor jackshaft belt. The motor is mounted under the bench. The safety drive is applicable to bench lathes of Rivett or other makes.

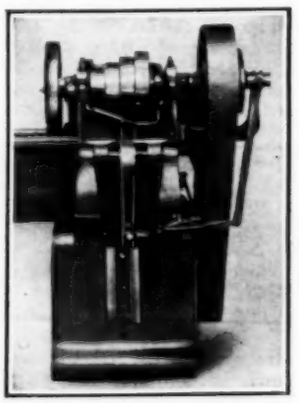
It will give a smooth drive which is particularly desirable on high-grade precision work.

— 73 —

Motor Drive for Cone-Head Lathes

Sebastian Lathe Co., Cincinnati, Ohio. [Vol.68,p.1061]

A motor drive has been developed by the above mentioned company for its cone-head lathe. The motor is built into the cabinet base under the headstock. As shown in the illustration, the cone pulley is supported by a box-type bracket placed in line with the cone headstock so that it does not shut off light from



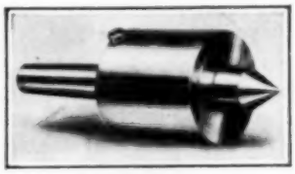
the work. Starting and stopping of the machine is effected through a friction pulley controlled from the apron. The adjustment of the belt is accomplished by means of a hand-wheel placed on the front of the machine. Cast-iron guards surround the driving belt.

— 74 —

Centers, Anti-Friction

Snellex Manufacturing Co., Rochester, N. Y. [Vol.68,p. 948]

This center is made for production work and automatically takes up the expansion of the work by means of a hardened steel cushion. It does not need lubrication on the center point because the roller bearings eliminate the wear between the point and work.



The wear of the bearings is automatically taken up as both tapered roller bearings have the thrust in the same direction. This center can be furnished in sizes having capacities up to 3 tons load capacity and can be made with any kind of taper and any kind of center point.

Milling Machines

— 75 —

Milling Machines, "Mil-Waukee Mils," Series 1400 and 2200

Kearney & Trecker Corporation, Milwaukee, Wis. [Vol.68, p.317]

Two series of sizes are now available. Both series come in six lengths of table travel and bed. The table travels are 3, 4, 5, 7, 9 and 11 ft. and the bed lengths range from 4 to 16 feet.

The 1400 series machines have table widths of 14 in., while the 220 series are equipped with 22-in. tables. Both series are available in Simplex and Duplex types.

The operating features are identical in both series, and any model may be equipped as a complete automatic machine. For small lot work, many sizes can be furnished with quick-change, selective-type speed and feed gear boxes.

The Simplex models weigh from 8,300 to 13,600 lb. for series 1400 and from 10,000 to 18,000 lb. for the series 2200 The Duplex models are slightly heavier.

— 76 —

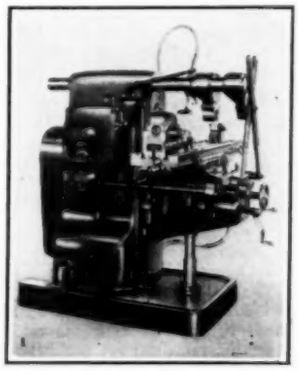
Milling Machines, Knee-Type, "Standard"

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.68,p.35]

Simplicity of control and convenience of operation are the features of this line manufactured in the following sizes: Nos. 2A and 3A universal, and Nos. 2B and 3B plain.

One feature is the dual feed control which permits table feed changes to be made from either th front or the rear. Fast power travel is provided for all three feeds on the standard machines. The knee-clamp lever can be readily reached from either the front or rear.

A single lever at the left operates all changes of spindle speed, and a direct-reading dial indicates the speed. Two series of speeds are available for the back-gears.



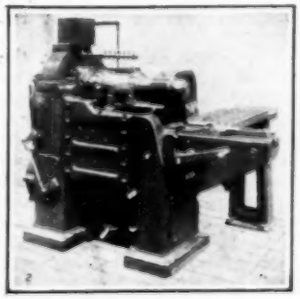
All units in the column and driving clutch are automatically supplied with filtered oil. The knee mechanism is lubricated by a pump. The saddle mechanism and table bearings are oiled from a single well at the front of the machine. Either a flood supply or a thin stream is possible for the cutter coolant.

— 77 —

Miller, Finishing, Car Journal Bearing

Morton Manufacturing Co., E. Broadway and Hoyt St., Muskegon Heights, Mich. [Vol. 68,p.902]

This miller is designed for finishing the surfaces of car journal bearings, fillets, and ends after being babbitt lined. The column is of box construction, and is designed with fixed center distance for shaft and gear journal bearings.



The chuck is of box construction, and is provided with rotating jaws which open and close automatically. The quill is provided with lock nuts for adjusting the setting for different size bearings. Adjustments to 1/64 in. can be made. Power for raising and lowering the chuck is applied through levers and adjustable connections.

A cam controls the cycle of operation and three succeeding cuts of 0.023 in. can be taken, if desired. The control lever is located conveniently. Power is applied through gears for driving the cutter and arbor, and a friction clutch and brake are used for stopping and starting.

A special spindle steel is used for the arbor and shafts, and the bearings are bronze bushed and those in the main column are automatically oiled. Pinions subject to heavy strain are made of steel. They are inclosed and run in oil. The outer bearing of the cutter arbor is tongued and fitted to a centering slot. It can be removed easily to change cutters.

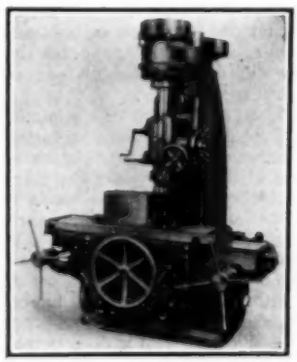
The lubrication of the cutter is done automatically by gravity, the control valve being operated by levers and also by a vertical rod which is lifted by the chuck on starting. A manifold with needle valves regulates the distribution of lubricants for various size cutters. The power for driving may be derived from a direct-connected constant-speed motor operating on a.c. or d.c. or from a countershaft.

— 78 —

Miller and Die Sinker, No. 5, Becker

Reed-Prentice Corporation, Worcester, Mass. [Vol.68,p. 233]

This unit is suitable for the vertical milling of large and heavy castings and for the machining of drop-forged dies.



Rigidity is secured through the use of a solid base with an adjustable head and spindle quill.

High spindle speeds for use with end mills and die sinkers are obtained through a belt drive. A wide range of spindle feeds and speeds are available there being eighteen spindle speeds and eight feeds. All speed and feed gears are of heat-treated alloy steel running in oil. Timken roller bearings are used in the speed, feed and top gear boxes as well as on the spindle. The spindle is made of heat-treated forged nickel-chromium steel, and has a clutch-type standard spindle nose.

Rapid power traverse in either direction is supplied to the longitudinal cross feeds. The nuts are made of special phosphor bronze. The saddle extends for the full length of the table, and has four scraped bearing surfaces. The control levers are centralized at the front for convenient operation. A micrometer stop gage is used to control the depth of the cut.

The miller is supplied with either belt or direct belt-connected motor drive. A 7½ hp. motor is used. The main drive pulley is supplied with a clutch and integral brake.

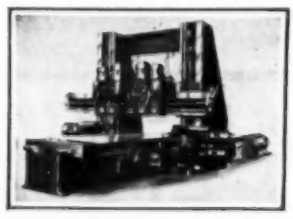
Floor space 110x95 in., height 98 inches.

— 79 —

Milling Head, Unit, Putnam

Shaw-Crane-Putnam Machine Co., Inc., Fitchburg, Mass. [Vol.68,p.827]

Individual requirements can be met by this unit milling head; the driving motor can be obtained in various horsepowers, and the range of feeds and speeds can be selected to suit.



It is possible to adapt this equipment to other planer-type milling machines.

The machine illustrated is provided with milling heads having sixteen speeds in either direction, twelve feeds in either direction on rail or housing and twelve feeds of the quill. Rapid traverse along the rail and for moving the quill are incorporated. All spindles are mounted in Timken tapered roller bearings to insure accuracy and long wear. Helical gears are used for the drive.

Work can be milled up to the full width of the table and profiling operations can be extended beyond the table width, depending upon the length of the rail. These features permit the handling of very large work of irregular shape.

Planers and Shapers

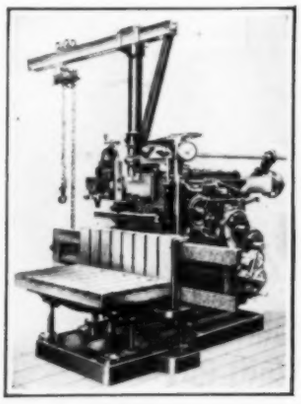
— 80 —

Planer, Draw-Cut, High-Duty

Morton Manufacturing Co., Muskegon Heights, Mich. [Vol. 68,p.949]

This draw-cut planer is designed for railroad work, but is suitable for short stroke shaping and planing. The particular work for which the machine is intended is the machining of guide yokes, tie braces and cross tie braces.

This machine has a 38-in. cutting stroke, a 60-in. horizontal feed, and a 21-in. vertical feed. It is of the 4-screw type. Rapid power traverse both horizontally and vertically are features. All feeds are automatic, and can be changed while the machine is in operation. The planer has a rotating arbor for slotting and finishing driving boxes. It will accommodate all Morton attachments for railroad work.



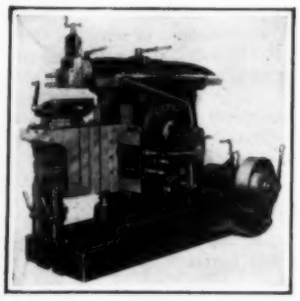
— 81 —

Shaper, "Steptoe"

Western Machine Tool Works, Holland, Mich. [Vol.68,p.477]

Ability to take exceptionally heavy cuts is claimed for this line which is built in four sizes having 14-, 16-, 20- and 24-in. stroke, respectively. The machines are available in single- and back-gear styles.

The length of the stroke can be adjusted by means of a self-locking device while the machine is at rest or in motion. When equipped with speed box having backgear drive, eight cutting speeds for the ram are provided. The ram is held in long heavy guides. Timken tapered roller bearings have been applied to the entire drive.



For motor drive or single-pulley drive with gear box the strokes per minute vary from 20 to 61 for the smallest size to 5 to 64 for the largest size. For cone-pulley drive, the strokes vary from 15 to 52 for the smallest size to 5 to 70 for the largest size.

Power required 2 to 5 hp.; floor space 46x65 to 59x104 in. Weights 1,975 to 4,100 pounds.

Presses

— 82 —

Press, Inclinable, Open-Back, "Canco"

American Can Co., Equipment Division, 120 Broadway, New York City. [Vol.68,p.1021]

This open-back inclinable press is built in plain and geared types available in either standard or deep-throat styles. The frame is a semi-steel casting. All bearings and the slides are scraped in and the crankshaft is of chrome-nickel steel, heat-treated. The clutch has six engaging points, making for fast operation. A pawl, by which the operator is enabled to run the press backward, is a part of the mechanism, and is of great value when setting dies. Either of two types of brakes can be furnished—cam actuated for presses intermittently operated, and treadle release for presses operating continuously.

Other features include finished surfaces or pads for the application of attachments, feeds and gages, and three steps for inclining. The Dot system of lubrication is used.

The plain styles of the standard presses are built in seven sizes ranging in weight from 860 to 8,413 lb., while the plain, deep-throat presses are made in three sizes varying in weight from 1,855 to 4,650 lb. The geared styles are built in six sizes, weighing from 1,170 to 9,110 lb. for presses having standard throats, while only one size is made with a deep throat, weighing 4,950 lb. The standard length of stroke for all sizes of both types is 3 in. The maximum length of stroke varies from 4 to 6 in. for the ordinary

type and from 4½ to 5 in. for the deep-throat type.

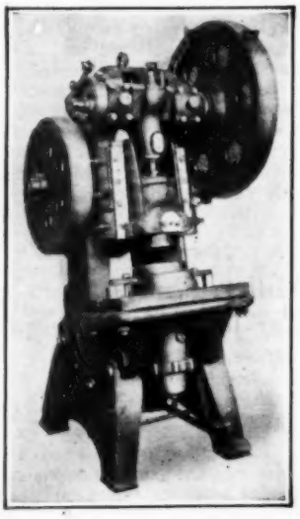
The floor space required ranges from 25½x23 to 51x44 in. for standard presses and from 36½x31 to 48x42 in. for the deep-throat presses.

— 83 —

Power Presses, Inclinable, Schuler

J. I. Bernitz, 25 Beaver St., New York, N. Y. [Vol.68,p.679]

Air-cushioning of the dies provides an arrangement by which the air pressure is automatically restored on the return stroke. The machines, built in eleven sizes, are used with combination dies for simultaneously cutting, stamping, drawing and embossing the tops and bottoms of tins or boxes. The finished



piece is ejected upwards and slides out of the back of the press.

The frame can be set to the inclined and vertical positions by means of a handwheel. An adjustable slide is fitted with cap and screw for clamping the top dies, and an adjustable bed which works in V-gibs permits further variation. The adjustment of the slide varies from 1⅜ to 3¼ in. according to size. Dies of varying heights may thus be accommodated. The adjustable bed, which is also detachable, is useful in connection with deep punching and drawing.

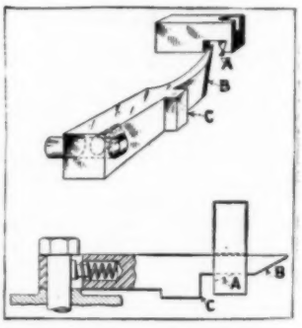
The machine is driven from a two-speed motor. Either 45 or 90 strokes per min. with a range of 0.4 to 3 in. may be obtained, covering many operations.

— 84 —

Shock Absorbing Latch on Loshbough-Jordan Presses

Loshbough-Jordan Tool & Machine Co., Elkhart, Ind. [Vol.68,p.277]

Inclinable open-back punch presses made by this company are now equipped with a safety latch and shock absorber.



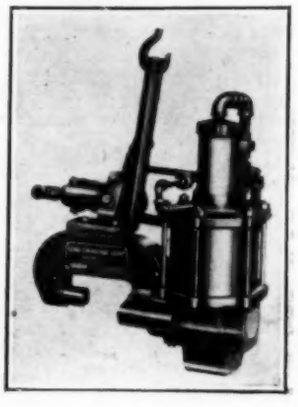
With this shock absorber latch it is possible to operate the press at 25 to 50 per cent higher speeds than is usually recommended without sacrificing the safety. The latch practically eliminates the brake which slows up production due to heating the bearing. In addition a saving of power is accomplished.

— 85 —

Press, Shackle Pin, Pneumatic, Portable

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.68,p.1070]

This portable pneumatic press exerts eight tons pressure and weighs 95 lb. It has a 2-in. depth of throat, a 6-in. gap and



a ⅜-in. die stroke. Several other sizes are available.

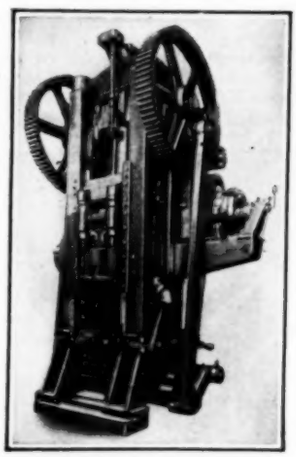
This machine is adapted to pressing shackle pins into automobile chassis frames. The tonnage exerted and the short stroke adapt it to shackle pins which are serrated under the head. The mechanism between the air piston and die is of the roller and wedge type which provides a variable leverage or pressure to conform to the work to be done. This feature results in low air consumption.

— 86 —

Press, Double-Action, Special, Large Size

E. W. Bliss Co., Brooklyn, N. Y. [Vol.68,p.198]

Weighing about 400,000 lb., this special double-action press is the largest ever built by the above company. The crank shaft is 18 in. in diam. at the



bearings and 21 in. at the pins. It is adapted for the cutting and drawing of heavy metal and will draw and lift out work up to a depth of 11 in. It has a capacity of 1,000 tons, there being 500 tons on the blankholder and 500 tons on the plunger. The entire working strain is taken by four large steel tie rods. If desired, the inner and outer slides can be locked together and the press used as a single-action press for work requiring a pressure of 1,000 tons.

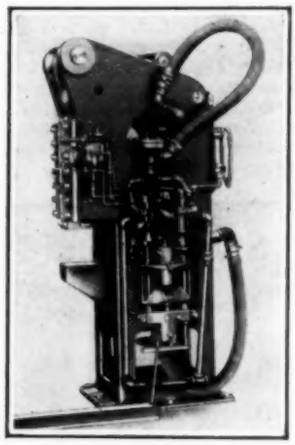
When used as a double-action press, the blankholder is operated by long links inside the housings that are connected to a crankshaft in the bed. The crankshaft is operated by the main gears through a toggle motion and has four crank pins, two of which are used to operate the blankholder, and the other two used to operate the positive liftout in the bed. The distance between housings is 60 in., and the distance from the bed to the blankholder is 42 in. The adjustment on the blankholder, which is 8 in., is made by a 15-hp. motor mounted on the crown. The main drive is by a 125-hp. motor.

— 87 —

Press, Pneumatic, High-Speed

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.68,p.705]

Coining, squeezing, forming, upsetting, shallow drawing, extrusion and punching comprise the operations that it is possible to perform with this press, available in numerous styles and tonnages. The press shown will



exert a pressure of 150 tons at an air pressure of 100 lb. per square inch.

The air-cylinder piston unit actuates the ram by means of a toggle and lever mechanism, while the lever exerts a uniform tonnage on the dies through a considerable portion of the ram stroke. The ram is set by adjusting a handwheel and the tonnage may be adjusted from 20 to 100 per cent of rating.

A speed of 30 to 40 cycles per min. is obtainable. Cushions absorb shock on both extremes of the stroke while the air counterbalance prevents heavy impact. Only one die stroke cycle will result from each depression of the foot trip pedal.

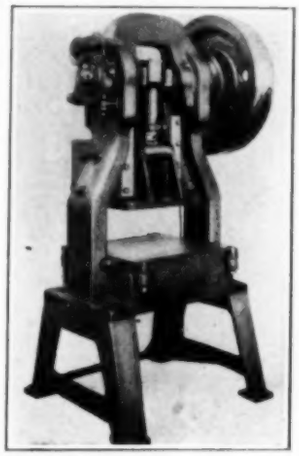
— 88 —

Press, Arch, "Canco"

American Can Co., Equipment Division, 120 Broadway, New York City. [Vol.68,p.1021]

Large blanking and forming operations are readily performed on this arch press. Features common to the general line of "Canco" presses are included, such as semi-steel castings, and the clutch and cam-actuated brake. Ample die space is provided and can be further enlarged by removing the front of the bed, thus making the machine suitable for the use of well-type dies.

The arch press is built in two sizes known as 4-E and 4½-E. The strokes of the slide, standard and maximum, are 3 and



5 in. for the No. 4-E and 3 and 6 in. for the No. 4½-E. The adjustment of the slide is 3 in. in each case. The distance between the uprights is 28 and 30 in., respectively. The sizes of the bolster plate with removable front are 26x27 and 28x29 in., while those of bolster plates with solid fronts are 23x27 and 26x29 inches.

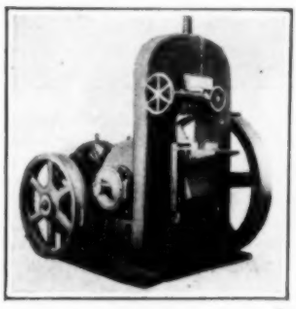
The overall floor space occupied is 40x45 and 42x51½ in., respectively, for presses having straight legs. The geared presses weigh 4,900 and 6,700 lb., have 55 and 45 strokes per min. and occupy a floor space of 43x59½ and 48x70 in., respectively. Both the plain and geared presses are built in inclined-leg and motor-driven types as well as the straight-leg type mentioned.

— 89 —

Press, Embossing, Toggle, "Canco"

American Can Co., Equipment Division, 120 Broadway, New York City. [Vol.68,p.1021]

These seven sizes of toggle embossing presses are capable of exerting pressures from 150 to



1,200 tons. The first of the series is of the plain type, and all of the rest are geared.

The main frame is a solid, annealed steel casting. The slide is designed with the toggle lever at the bottom with the gearing placed close to the floor to overcome vibration. The toggle lever is made from a steel casting and the toggle seats and pins are of tool steel, hardened and ground.

The adjustment of the upper platen is obtained through the action of a steel wedge. A dial adjustment is provided that enables the operator to keep an accurate record of the setting of the dies. A shear pin can be furnished.

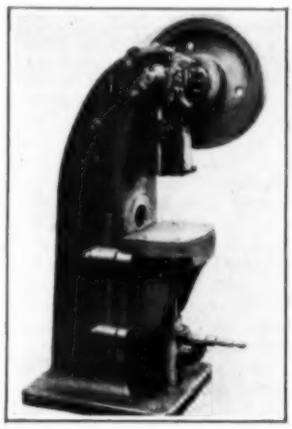
The weights of the seven toggle presses vary from 4,200 to 34,000 lb., while the distance between the uprights ranges from 11¼ to 20½ in. The maximum die space varies from 12½ to 14 in. The stroke is 1½ in. in every case and the number of strokes per minute ranges from 85 to 35. Floor space varies from 47x45 to 105x100 inches.

— 90 —

Press, Horn and Apron, "Canco"

American Can Co., Equipment Division, 120 Broadway, New York City. [Vol.68,p.1021]

This horn and apron press has a semi-steel frame, and a large hole through the column permits the use of a horn having a sturdy shank. The apron is a semi-steel casting clamped to the column so that rigidity



with easy adjustment is possible. An efficient elevating device is provided for the apron, which is also fitted with an anti-friction sliding bolster.

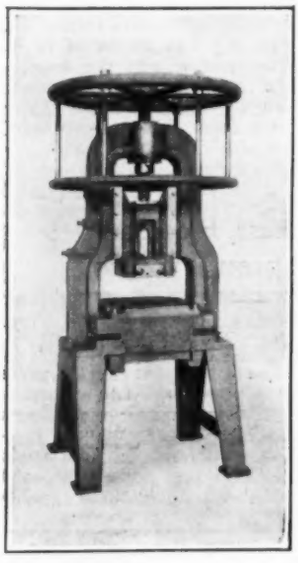
This horn press is built in six sizes in the plain style, and in two sizes in the geared style. The weights of the former range from 980 to 3,715 lb., while the latter have weights of 2,925 and 4,115 lb. The standard and maximum lengths of stroke are 1½ in. standard and 3½ in. maximum for the smallest size, and 1½ and 6½ in. for the largest size. The depth of throat measured from the center of the slide to the frame, ranges from 4 to 10 in. Sizes of bolster plates range from 8x13 to 18x23½ in. The floor space required is 24x 20½ in. for the smallest press while the largest machine occupies a floor space of 40x28 in. Horn holes range from 2½ to 5½ in. in diameter.

— 91 —

Press, Screw "Canco"

American Can Co., Equipment Division, 120 Broadway, New York City. [Vol.68,p.1021]

This "Canco" screw press is particularly adapted to testing dies, although it can be used for general screw press work. It is fitted with an auxiliary hand-



wheel forming a round cage frame. This feature eliminates the hazard from an overhanging bar.

The press is built in three sizes, Nos. 2, 3 and 4, having weights of 2,475, 3,200, and 4,300 lb. The maximum lengths of stroke of the slides are 7½, 7½ and 8 in. The die space is 11, 11½ and 11½ in., and the bolster plate sizes are 19x20, 21x22 and 24x27½ in. The distance between uprights are 20, 22 and 28½ inches.

Floor space; 32x34 in., 35x37 in., and 35x44½ inches.

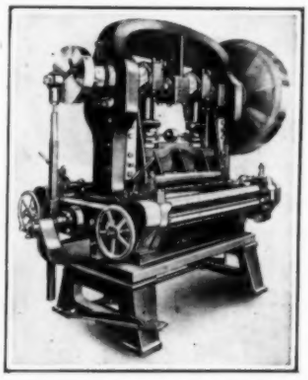
— 92 —

Punch-Press Feed, Automatic

F. J. Littell Machine Co., Chicago, Ill. [Vol.68,p.439]

An improved type of automatic feed was recently applied to one of the company's double-crank presses. The feed has a speed and an efficiency that enables it to cut over a million blanks a day when operating at only 75 per cent efficiency. The mechanism is of a double rack and pinion type, and takes material up to 1 in. in thickness. It will feed any kind of material ncluding rubber. In preliminary tests with the press running at 80 r.p.m., 37 blanks were cut in rubber per stroke.

This feed is equipped with double rolls and has a roller drive handwheel which does not



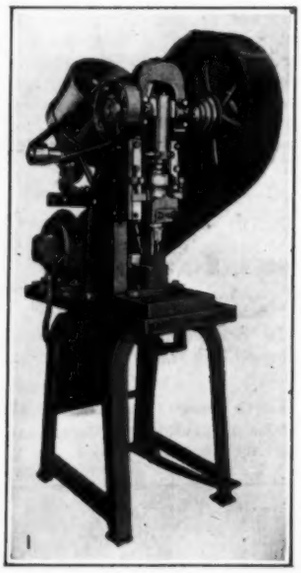
revolve when the feed is running, but which can be used to feed stock forward. The feed has both a hand and an automatic lifter.

— 93 —

Punch Press Feeds, Clinch-Nut, Automatic

F. J. Littell Machine Co., Chicago, Ill. [Vol.68,p.593]

Five types of these punch-press feeds have been developed. They were designed to fasten



clinch nuts to automobile bodies, and they clinch either flat-sided nuts or round ones.

The clinch-nuts may be fed from either top or bottom. Model A feeds the nuts at the bottom and lifts the body piece out automatically. This feed is for round clinch-nuts only. Model B is made in two styles for long and short strokes, respectively. It is particularly valuable for fastening round nuts to body parts that are deeply grooved or curved.

Model C is similar to Model A, but instead of raising the piece straight up, the automatic lifter ejects it to the front. This feed is also arranged with a thin anvil so that nuts may be inserted inside of U-shaped parts.

A fifth model was especially designed for feeding D-shaped or flat-sided nuts from either the top or bottom. The average operator can set from 25 to 40 nuts per min. with any one of these machines.

— 94 —

Coil Feeds for Punch Presses

F. J. Littell Machine Co., Chicago, Ill. [Vol.68,p.947]

These four reels for feeding coil stock to punch presses will handle a wide range of materials. The No. 1 reel has an automatic brake which is intended to prevent overruns. The No. 2 reel is designed for heavy coils, and will take stock up to 8 in. in width regularly, al-

though it can be furnished for greater width. The No. 1 cage-type reel is designed to handle spring metal, No. 1½ ball-bearing reel with plates is intended for very wide stock up to 16½ in. in width, and is suitable for coils with small holes.

Shearing and Punching Machines

— 95 —

Slitting Shear, No. 6

Whitney Metal Tool Co., Rockford, Ill. [Vol.68,p.237]

This roller-bearing slitting shear is made of alloy steel, drop-forged throughout, and all wearing parts are hardened. The eccentric crankpin and trunnion bearings are all of the roller type, and the machine is throatless.

The capacity of the shear is

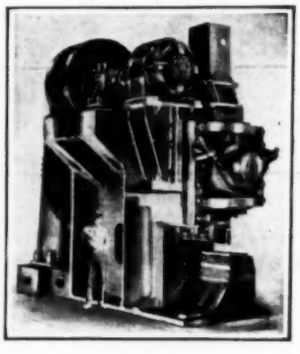
for all thicknesses up to and including ⅜ in. The shearing blades are inserted, and are 4½ in. in length. The lower shearing blade is adjustable for wear.

— 96 —

Shear, Open-Throat

McIntosh-Hemphill Co., Pittsburgh, Pa. [Vol.68,p.354]

This open-throat shear used for cutting cold alloy steel 4½-in. square, or 5-in. round, weighs 225,000 lb., and has a knife pressure of 1,400,000 lb. The shear has a stroke of 6½ in., and is designed to make about fifteen cuts per min. It is operated by a 125-hp. motor.



All gears, including the master gear and pinion, are continuous tooth herringbone. The flywheels, as well as all gears, are inclosed in oil-tight covers.

The eccentric shaft has a square end on which the loose clutch slides. The eccentric carries a solid bronze slide, and bronze liners are placed between the ram and the shear frame, while the front side of the ram is equipped with an adjustable wedge for taking up wear. The shear is controlled through an air-operated jaw clutch.

The top knife block is balanced with a double spring.

— 97 —

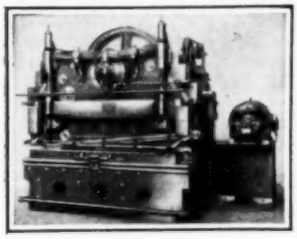
Shears, Gate, Types STA, STAQ and STAU

Henry Pels & Co., Inc., 90 West St., New York, N. Y. [Vol.68,p.828]

These three machines will shear up to 2-in. plate Three depths of throat may be obtained

in each 12, 24 and 30 in. Shearing lengths vary from 40 to 144 in. by increments of 20 inches.

Type STA will split or trim plates of unlimited length, to the limit of the throat depth. Type STAQ is equipped with cross knives located at right



angles to the main knives for automatically removing the scrap strip when trimming long plates.

The STAU universal machine has adjustable rake and cross knives. The rake adjustment permits the use of smaller degrees of rake than normally required when pieces must be perfectly flat. The machine will bevel the edges of plates to 15 degrees.

The frames of the machines are made of heavy steel plates, heat-treated. All gears have machine-cut teeth, and are placed inside of the frame. The pinions are cut from solid steel forgings. The eccentric shaft and upper knife slide are connected by one plunger on the 40-in. shears and by two plungers on the larger shears.

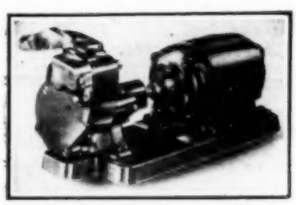
The holddown is fully automatic and does not require adjustment for cutting plates of varying thicknesses. The clutch is operated by foot trip and disengages upon completion of the stroke, or can be locked for continuous operation. Shaft bearings are of phosphor bronze.

— 98 —

Unishear, Model A-10

Unishear Company, Inc., 270 Lafayette St., New York, N. Y. [Vol.68,p.1026]

Any line, whether straight, curved, or irregular, can be followed through 10-gage sheet



steel with this machine at a cutting speed of 10 ft. per min. It will also handle notches. No filing or trimming to the desired outline is required.

Motors of ¾ hp. are used which run at 3,450 r.p.m. on either 115- or 230-volt d.c. or 110- or 220-volt a.c. at 60 cycles on single-phase or three-phase circuits. In addition, motors can be furnished for 110- or 220-volts, a.c. 25-cycle, single-phase circuits.

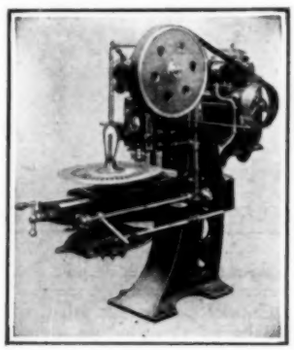
Weight, 165 pounds.

— 99 —

Notching Machines, Automatic, High-Speed "Schuler"

J. I. Bernitz, 25 Beaver St., New York, N. Y. [Vol.68, p.708]

Ability to punch 600 notches per minute, one at a time, is claimed for the five sizes of these machines, which are intended for the notching of rotor and stator laminations from 10



to 59 in., pitch circle diameter. The frame is a hollow casting with a protruding saddle.

The machine may be driven by a Norton gear box giving ten speeds for the three smaller sizes and eight speeds for the two larger sizes, or by a variable-speed motor.

The slide moves in long, adjustable pneumatic guides and may be moved vertically. The table carries the saddle stock on pneumatic guides and is set by a spindle. Sheets are fixed in position on the two smaller machines by a bayonet lock, and on larger sizes by an electromagnetic device.

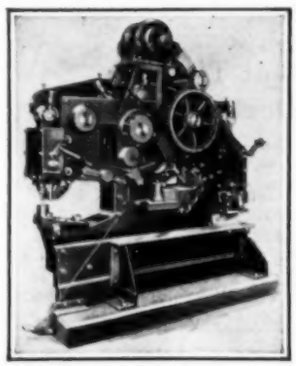
— 100 —

Iron Workers, Universal, Nos. 2½ and 3½

Buffalo Forge Co., Buffalo, N. Y. [Vol.68,p.513]

These machines are combination punches, slitting shears, and bar cutters. All three tools are actuated during the course of one revolution by a single eccentric, and as they do not act in unison, overloading is avoided. This construction permits using the three separately-controlled parts of the machine at the same time. Interchangeable high and low die blocks are a feature.

The No. 2½ "Armor Plate"



machine has a capacity to punch holes 1 $\frac{5}{16}$ in. in diam. through ¾-in. plate, shear ¾-in. plates through the center, and cut 2½-in. round and 2-in. square bars. It has a depth of throat of 20 in., and a length of knives of 12 inches.

The No. 3½ machine has sufficient capacity to punch holes 1¼ in. in diam. through ¾-in. plate, shear ¾-in. plates through the center, and cut 2½-in. round and 2¼-in. square bars. The depth of throat is 20 in., and the length of knives is 13½ inches.

The No. 2½ machine is driven by a 10-hp. motor, and occupies a floor space of 7 ft. 4 in. x 4 ft. The weight is 8,250 lb. The No. 3½ machine is driven by a 15-hp. motor and occupies a floor space of 8 ft. x 4 ft. 3 in. The weight is 9,600 pounds.

— 101 —

Shear & Nibbler, "Handnib"

National Machine Tool Co., Racine, Wis. [Vol.68,p.754]

Any shape of template can be cut quickly by means of this device, which can be mounted

in any vise. Sheet metal, so cut, requires very little filing. The concave cutting knife shears along curved lines, while a semi-circular punch cuts out the difficult corners.

The shear blades are made of high-grade tool steel, and can be easily removed for sharpening. The length of blade is 4½ in., and has a capacity of shearing ¼-in. flat stock.

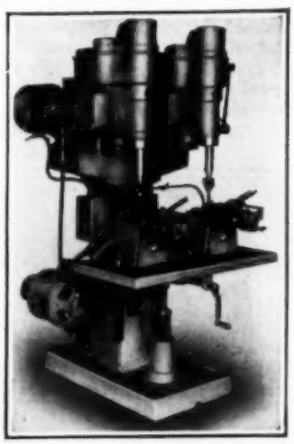
Threading Machines

— 102 —

Tapping Machine, Pneumatic, Double-Spindle, Heavy-Duty, No. 10S

W. Gaterman Manufacturing Co., Manitowoc, Wis. [Vol.68, p.1066]

Automatic feeding and ejecting devices for tapping nuts have been applied to this ma-



chine, which has many features in common with the No. 10 tapper described on page 639, Vol. 67, of the *American Machinist*.

The feeding of nuts from the magazine to the taps, and the ejection therefrom, are actuated by pneumatic means. The machine will tap 1,500 ¾-in. and 2,200 ½-in. U. S. standard nuts per hour, and other sizes correspondingly. The fixtures can be removed easily and the machine used as a general tapper.

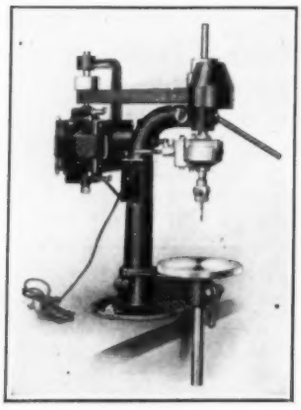
Weight 3,600 pounds.

— 103 —

Tapping Attachment for C-O Drill Press

Eastern Tube and Tool Co., 594 Johnson Ave., Brooklyn, N. Y. [Vol.68,p.1070]

This motor-driven machine consists of a No. 1 "Ettco" vertical tapping attachment applied to a special "C-O" ball bearing drill press. The tapping attachment was described on page 941, Vol. 56, and the C-O drill press, made by the Canedy-Otto Manufacturing Co., Chicago Heights, Ill., was described on page 521, Vol. 67, of *American Machinist*. A capacity for tapping holes up to ½ in. in diam. is provided.



The spindle, which is accurately ground and equipped with ball thrust and radial bearings, runs at 850 and 1,400 r.p.m. The work is held on a round table 8 in. in diam. The up and down movement of the spindle is 2½ in., and that of the table is 7 in., while the greatest distance between the tap chuck and the table is 6 in. Motors for driving this machine may be obtained for 110 or 220 d.c. or a.c., 60 cycle, single phase.

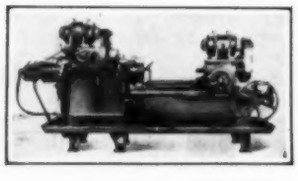
Height 22¾ in., weight 78 pounds.

— 104 —

Thread Miller, No. 20

Smalley General Co., Bay City, Mich. [Vol.68,p.396]

Rigidity and ability to do heavy work without chatter are the principal features of this production unit that approaches a jobbing machine. On this machine it is possible to mill



external threads from ⅛ to 8 in. in diam. and internal threads from ½ to 12 in. in diam. with pitches from 30 per in. up. It can also be used for form milling.

The outstanding improvement is the milling head, which is mounted in Timken tapered roller bearings. The milling spindle is equipped with a No. 13 B & S taper, and is driven by helical gears running in oil. The main spindle has a 6¾-in. hole cut in the center, and is flanged at the front end, making quick changes of chucks possible.

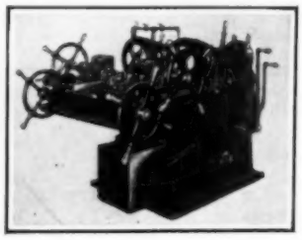
The machine is built for either motor or belt drive. The motor-driven machine has eight speeds on the main spindle and six on the milling spindle when a four-speed motor is used. The belt-driven machine has a three-step cone on the main spindle.

— 105 —

Bolt Threader, Double-Head

Williams Tool Corporation, Erie, Pa. [Vol.68,p.194]

This bolt threader is built in two sizes. The 1½-in. size threads bolts from ⅜ to 1½ in. in diam., while the 2-in. size threads bolts from ½ to 2 in. in diam. The dual heads permit



using two set-ups at the same time. Also two different sizes of threads can be run through together. Eight spindle speeds for each of the die heads are provided.

Automatic compression springs open and close the dies, and the heads are adjustable to the size being cut. Bolts are released automatically by trip rods adjusted in the carriage. The dies for either head can be removed and changed without removing the large dieholders.

The driving motor is built into the base of the machine. All driving gears are of hardened steel, running in oil. The diehead is amply lubricated by means of a chain-driven pump.

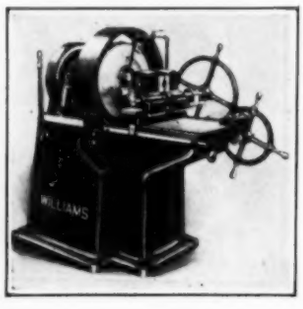
— 106 —

Threading Machine, Pipe, "Rapid Rotary"

Williams Tool Corporation, Erie, Pa. [Vol.68,p.867]

Bent pipe and nipples can be threaded on this machine in sizes from 1 to 4 in. which are covered by four sets of dies. By the substitution of special dies ⅛- and ¾-in. pipe can be threaded. At the same time that the threading is being done, the burr formed during the previous cutting-off operation is removed.

The "Rapid Rotary" has a spindle speed of 19 surface ft. per min. regardless of the size of pipe to be threaded. An auto-



matic tripping device, consisting of a cam and lever, throws the dies open after the thread is cut.

— 107 —

Chuck, Tap Holding, "Ettco"

Eastern Tube & Tool Co., 594 Johnson Ave., Brooklyn, N. Y. [Vol.68,p.195]

The gripping jaws of this chuck operate by means of right- and left-hand threads and are free to close transversely, as their only function is to grip the square and prevent the tap from rotating. The tap is centered by three jaws made of

high-carbon alloy steel, heat-treated and ground.

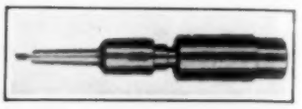
Chucks can be furnished with the backs threaded or tapered. They are also made with the back extended 1 in. so that they can be used in tap holders of screw machines. The chucks are furnished in three sizes, No. 1 for round shanks up to ¼ in. in diam., and taps up to ⅜ in., No. 2 for ⅜-in. shanks and ½-in. taps, and No. 3 for ½-in. shanks and ⅝-in. taps.

— 108 —

Chuck, Friction-Drive, Vertical Float, "Apex"

Apex Machine Co., 300 Davis Ave., Dayton, Ohio. [Vol.68, p.862]

If a tap carried in this chuck sticks or strikes bottom, the friction will be overcome and slippage will result, while the spin-



dle travel is taken care of by the float. The friction unit consists of a multiple-disk clutch.

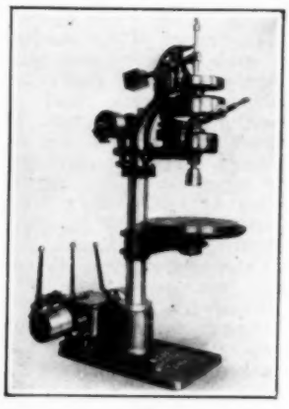
This chuck is made in two sizes. Type MA has a capacity for taps up to ⅜-in., the outside diameter being 1⅞ in., and type MB has a capacity for taps up to ¾ in., the outside diameter being 1⅞ inches.

— 109 —

Speed Box for Garvin Tapping Machine

Western Machine Tool Works, Holland, Mich. [Vol.68,p.945]

Direct shifting from one to another of four speeds is the principal feature of the Garvin speed box, which may be applied



to the No. 2-X belt-driven, and the No. 2-BG automatic motor-driven tapping machines manufactured by the above company. Shifting is accomplished by means of convenient levers.

These machines are ordinarily furnished with 1,200-r.p.m. motors. When the speed box is used, the 2-X automatic tapper has spindle speeds of 223, 300, 432, and 582 r.p.m., while the No. 2-BG machine has spindle speeds of 56, 76, 109, and 149 r.p.m. Speeds of 84, 114, 153 and 224 r.p.m. may be obtained on the No. 2-BG tapper by a 1,800-r.p.m. motor.

Welding Machines

— 110 —

Butt Welder, Type B

MacLeod Co., Station B, Cincinnati, Ohio. [Vol.68,p.37]

This machine is applicable to production jobs as well as small lots. It is obtainable in eight sizes, each designed to handle a wide range of work. All are made for operation with alternating current only, and are made for use on 110-, 220-, 440-, and 550-volt, 60-cycle circuits. The smaller sizes operate on 110-volts. Welding areas range from $\frac{1}{32}$ to 5 square inches.

Two hardened pieces can be welded without annealing more

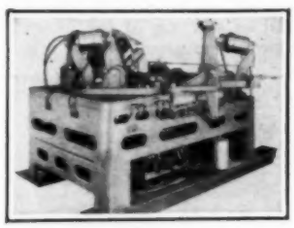
than a length equal to the diameter of the piece. Shanks may be welded to taps, reamers or drills without annealing the body of the tool in so doing.

— 111 —

Butt Welder, No. 41

Thomson Electric Welding Co., Lynn, Mass. [Vol.68,p.395]

This butt welder is designed primarily for the welding of sheet-metal automobile body assemblies. It will handle seams



up to 50 in. in width, and was designed for handling automobile stock sheets 0.53 in. in thickness. It is claimed that only a small amount of finishing is needed.

The push-up mechanism and drive mechanism consist of a 3-hp. motor connected to a reduction gear unit, and through spur gearing to the camshaft.

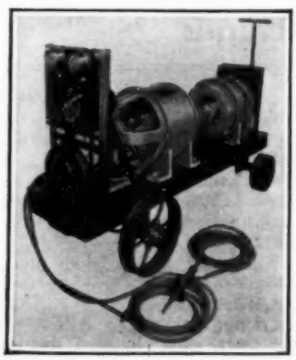
Floor space 48x92 in.; weight, 20,000 pounds.

— 112 —

Welders, Standard, Type S

Wilson Welder & Metals Co., Hoboken, N. J. [Vol.68,p.200]

There are no live connections on the front of the control board of this machine. The main switch is inclosed, and is mounted on the back of the



board, and only a dial and pointer appear on the front. The reactor is underslung and is so placed over the rear axle that it is protected from injury.

Another feature is a rotary switch designed to give close welding regulation. The arc may be made either short or long, and high, open-circuit voltage can be maintained for long arcs, or low, open-circuit voltage for short arcs.

Due to the close control mentioned, the type "S" welder is suited to overhead welding. It can be supplied in the following forms: Motor generator set with capacity ranging from 2 to 600 amp. to supply either one or two operators, and gas-engine and belt-driven types, with a capacity from 2 to 300 amp. to supply one operator.

— 113 —

Arc-Welder, 200-Ampere

Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa. [Vol.68,p.595]

This arc-welder may be started directly across the line by means of push-button control. The

unit is rated at 200 amp., 1 hr., 50-deg. rise on a resistance load at 25 volts. The motor is wound for 220 or 440 volts, for operation on a 3-phase, 60-cycle circuit.

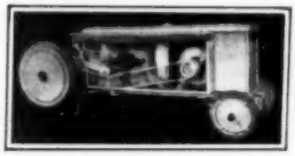
The welder is assembled in a totally-inclosed frame which is overhung from the motor end. Steady welding current may be obtained from 60 to 300 amp. The current is furnished by a constant-current generator, while a separate exciter is used to insure high welding speed. The generator voltage responds to changes in arc conditions.

— 114 —

Welder, Tractor

General Electric Co., Schenectady, N. Y. [Vol.68,p.595]

The principal equipment consists of a standard Fordson tractor, belt-connected to a type WD-300-A, 25-volt, 300-amp. 1-hr. ball-bearing generator, running at 1,750 r.p.m. Other equipment includes governor, power take-off, belt tightener,



control panel and reactor, and battery charging control.

The outfit is useful to welding contractors, boiler shops and tank builders. The utility of the tractor as a hauling device has not been impaired. The battery is charged while the welding generator is operating.

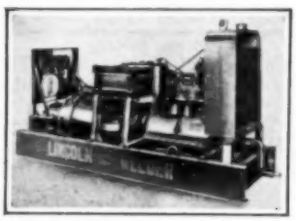
Length 12 ft.; height 4 ft. 8 in.; width 5 ft. 2 in.; weight, 4,900 lb. net.

— 115 —

Welder, Gas-Engine Driven

Lincoln Electric Co., Cleveland, Ohio. [Vol.68,p.594]

Gas-engine drive of the Model S-1960 "Stable-Arc" welder is accomplished by means of a four-cylinder type H-9 Continental "Red Seal" engine. The



unit is self contained, has light weight, and is portable.

The welder has a rating of 200 amp. with a current range from 50 to 300 amp. and operates at a speed of 1,500 r.p.m. The generator and switchboard are entirely constructed of steel to reduce the possibility of breakage.

The welding generator and engine are mounted on a welded structural base.

Dimensions, 76x25 in.; weight, 1,580 pounds.

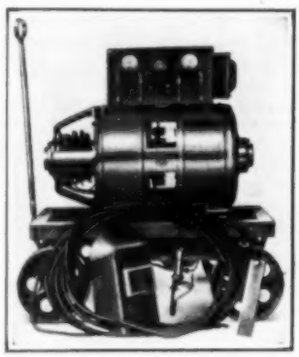
— 116 —

Electric Welders, Portable, Constant-Arc, Nos. 45 and 46

Hobart Brothers Co., Troy, Ohio. [Vol.68,p.789]

Compact, unit-type construction is offered in these portable electric welders, which have capacities of 10 and 15 hp., respectively. The motor and generator are built as a single unit.

The motor can be furnished for 2- or 3-phase operation. The generator is of the constant-potential, single-commutator type, and is ball-bearing equipped. It is self-exciting. Sparkless commutation results from the combined functioning of the



diverter-type winding and the inter-pole winding. The current capacities of the two machines are 475 and 300 amp., respectively.

The Nos. 45 and 46 machines will handle metallic electrodes up to $\frac{1}{4}$ and $\frac{3}{8}$ in., respectively and carbon electrodes up to $\frac{1}{2}$ and $\frac{3}{4}$ in., respectively.

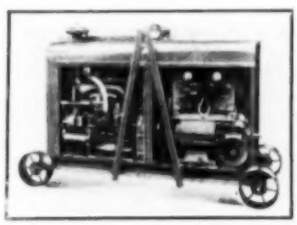
Weights 1,075 and 1,225 lb. respectively.

— 117 —

Welding Machines, "Alternarc" and "Dualarc"

Electric Arc Cutting & Welding Co., 1202 Maccabee Building, Detroit, Mich. [Vol.68,p. 1024]

The "Alternarc" machines are built for both cutting and welding operations. The equipment is adaptable to cutting cast iron, malleable iron, and non-ferrous metals, while the welding equipment is claimed to make non-porous deposits. It is built in two sizes, models F-650 and H-1200. The former is designed for rivet cutting, using currents



from 300 to 650 amp. The latter uses from 600 to 1,200 amp. for scrap cutting and foundry work. Control of the voltage and current is effected by means of a flux diverter with graduated scale.

The Alternarc welding equipment is built in models J and B, the former in sizes from 100 to 400 amp. for 220-, 440-, 550-, and 660-volts a.c., and latter rated at 200 amp. Model B is an all-purpose production machine, while model J is for light welding. A model C is rated at 300 amp., and gives 40 to 400 amp. for continuous manual welding.

The "Dualarc" generator will act as either a compound- or

differentially-wound machine. It is self-excited, and the series field cannot reverse and overbalance the shunt field. The reactor is of the open-circuit, open-core type, and adjusts itself to current requirements. Grid resistors give wide control of the amperage. The field rheostat gives an independent control of the voltage.

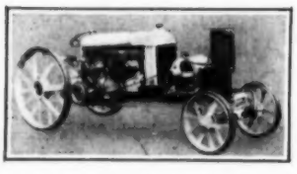
These generators may be either motor- or gas-engine driven. Generators, motor-generator sets, and gas-engine driven sets are built in sizes having ratings of 100, 200, 300, and 400 amperes.

— 118 —

Arc Welder, Pontiac-Lincoln

Pontiac Tractor Co., Pontiac, Mich. [Vol.68,p.1066]

The Lincoln "Stable-Arc" welder may be obtained mounted upon a frame which attaches to either the McCormick-Deering 10/20 or Fordson tractor. The



complete mounting consists of the welder, together with a stabilizer and panel. The tractors can be equipped with crawlers for work on soft ground.

Power is taken from the tractor to drive the welder through a power take-off pulley, which is equipped with a clutch. A belt tightener is included.

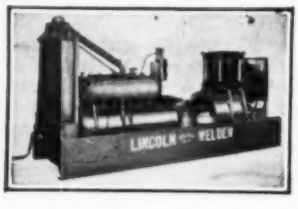
— 119 —

Welder, Gas-Engine Driven, Model S-1964

Lincoln Electric Co., Cleveland, Ohio. [Vol.68,p.1072]

This gas-engine driven model S-1964 welder is rated at 300 amp., and has a current range of from 75 to 400 amp. for metallic electrode welding. It is driven at 1,500 r.p.m. by a direct-connected model HS-6 Buda engine having six cylinders.

The engine has an S.A.E. rating of 27.3 hp. and gives 41 brake hp. The gas tank is located in the frame under the engine, thus eliminating fire hazard. The generator has the laminated magnetic circuit with



separately-excited field, stabilizer, variable voltage, and steel constructional features characteristic of the manufacturer's line of "Stable-Arc" welders.

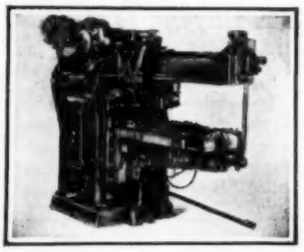
Length 93 in.; width 35 in.; height 45 inches.

— 120 —

Seam Welder, No. 436

Thomson Electric Welding Co., Lynn, Mass. [Vol.68,p.235]

Lap seam welding of steel barrels or drums is the function of this heavy-duty welder of the fixed lower horn, traveling-roller type which can be built with a jigging arrangement. The welder will handle clean material up to a maximum of



two pieces of No. 16 gage. The maximum stroke of the roller carriage is 40 inches.

The transformer is rated at 100 kw. Five points of heat can be secured through a regulator.

A uniform heat is secured through a secondary lead construction for the first 20 in. of welding. A seam longer than 20 in. is taken care of with an auxiliary choke. The welding speed is from 10 to 40 ft. per min. The drive of the roller carriage is by a 1-hp. motor through a Reeves variable-speed drive.

The traveling roller die is 12 in. in diam., and 1½ in. thick, clamped against a water-cooled mandrel. Almost any type of jig can be used.

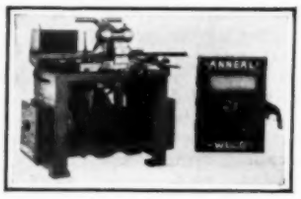
Floor space 10 ft. 6 in. x 3 ft. 4 in.; height 6 ft. 7 in.; weight 11,200 pounds.

— 121 —

Welder and Annealer, Bandsaw, Combination

Federal Machine and Welder Co., Warren, Ohio. [Vol.68,p.751]

This combination bandsaw welder and annealer was brought out to perform consecutively the two operations of welding and annealing. A separate voltage regulator and a separate annealing regulator are provided. When the work is placed in the machine a hinged stop placed back of the moving platen limits the back travel of the platen when setting up for the weld,



and when swung out of place permits an additional back travel for the next operation of annealing. The welding transformer and annealing transformer receive their energy through a double-throw switch. Resetting of the bandsaw and reclamping the dies for the annealing operation is eliminated with this machine.

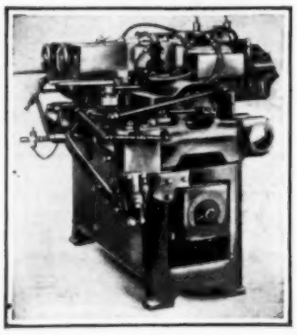
— 122 —

Welder, Flue, Model 55

Thomson Electric Welding Co., Lynn, Mass. [Vol.68,p.900]

This welder is suitable for continuous use and will weld flues from 2 to 6 in. in diam. The frame is of the side-rail type. The bearings for the side rods have standard bronze bushings. The transformer used is of 150 kva. capacity, and may be wound for operation on any standard voltage on 60-cycle, single-phase circuits. Control of the primary circuit is by means of a push button.

The horizontal clamps are air operated. The current is carried to the die blocks by means of a



flexible lead. Die blocks are adjustable in and out for obtaining accurate alignment of flues. The dies are made of cast copper and water-cooled and are relieved in their center portion to obtain a higher unit clamping pressure.

The pressure device of the hand-operated, oil-jack type is mounted on the frame. This unit will produce a total pressure of approximately 9 tons on the ram, and permits accurate control of the flashing, speed, and upsetting pressures.

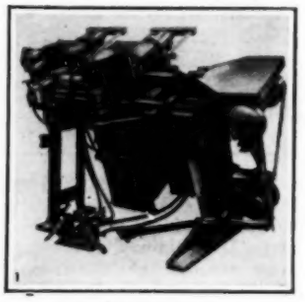
Floor space 21x53 in.; weight 6,800 pounds.

— 123 —

Butt-Welder, Miter No. 60

Federal Machine and Welder Co., Warren, Ohio. [Vol.68,p.898]

Miter welding of steel sash on a production basis is the field of this machine which embodies the Federal "flash-proof" principle. It is equipped with a 65-kv. transformer and an auto coil which provides 60 per cent voltage regulation. The clamping and releasing of the work as well as starting of the motor is done by means of foot levers.



A mechanical brake stops all motion at the end of the cycle. As shown, the machine will handle welds having a cross-section of 1 sq.in. Seven seconds are required for the welding cycle.

The inside dies are made of steel and insulated. The movable copper clamping dies are placed on the outside and act as electrodes. The movable dies are carried on hinged members, and the fulcrum points are well beyond the flashing zone. Clamping is done by air at 80 lb. per sq.in. The flash and push-up operation is produced by a motor-driven cam, controlled by an across-the-line starter.

Other Machines

— 124 —

Broaching Press, Axle, Hydraulic

American Broach & Machine Co., Ann Arbor, Mich. [Vol. 68,p.513]

A special machine used for broaching out the flash thrown up from welding operations. It is equipped with a rotating head which, upon the completion of the cutting stroke, positions the broach out of the path that it has traveled on the downward stroke, thus allowing it to come back through the housing without interference.

The machine is driven by a 10-hp. motor, is equipped with automatic stops for regulating the length of stroke, and is arranged with a pedal as well as

hand-lever control. It is of 12-ton capacity and has a 24-in. stroke.

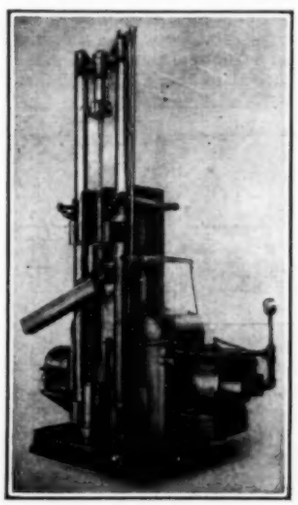
Working space, 6 ft. square; height 17 feet.

— 125 —

Broaching Machine, Vertical, V-50

American Broach & Machine Co., Ann Arbor, Mich. [Vol. 68,p.671]

Broaching of work up to 13 in. in diameter at cutting speeds from 0 to 30 ft. per min. can be accomplished on this semi-automatic machine. All that is required of the operator is to place the work on the end of the broach and operate two treadles. The first treadle actuates the lower cylinder of the machine so that the broach is started upward and automatically connects with the pulling head. The second causes the rams to pull the broach upward. The broach is returned to position at speeds from 0 to 80 ft. per min. The



machine is equipped with lubricating pumps. It is operated by oil at 1,000 lb. per sq. inch.

The capacity of the machine is 12 tons and the maximum length of broach that can be used is 50 in. Drive is by a 10-hp. motor.

Floor space, 4x6 ft., operating height 11½ ft.; weight 6,400 pounds.

— 126 —

Broaching Machine, "Pull-Type," Semi-Automatic

American Broach & Machine Co., Ann Arbor, Mich. [Vol. 68,p.705]

On this machine a large plate may be broached one hole at a time, or six holes may be broached at once in a smaller

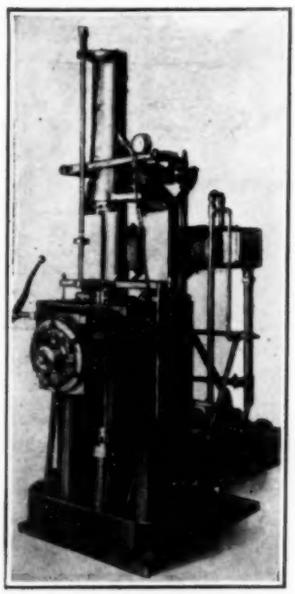


plate. When broaching single holes, a production of 600 holes per hour can be reached.

The machine is operated by two pedals. Depressing the first pedal causes the broach to move upward until it automatically connects with the pulling head. Depressing the second causes the pulling ram to start on its upward stroke. Return of the broach is automatic. The machine is operated by a hydraulic pump and occupies a working space 5 ft. square and has a height of 9 feet.

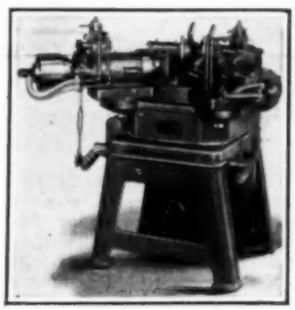
— 127 —

Chamfering Machine for Spiral Bevel Gears and Pinions

W. C. Lipe, Inc., 208 S. Geddes St., Syracuse, N. Y. [Vol.68,p.947]

This machine is manufactured in both single-spindle and double-spindle types. A production of 120 pinions or 80 gears per hr. per spindle is guaranteed.

As designed, the machine removes the burr and chamfers the acute angle at the ends of the teeth on both the inside and



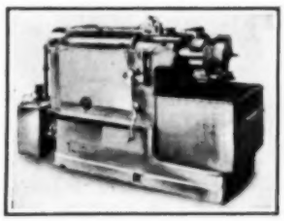
outside diameters of spiral bevel gears, and on both ends of the teeth of spiral bevel pinions. The chamfer is made to conform to the shape of the tooth. The gears or pinions are clamped to the workhead by means of an air-actuated chuck. The indexing mechanism is positive in action, and both the index and feed mechanisms are cam actuated. It is claimed that the machine is quiet in operation. Each spindle is driven by a motor as will be noted in the illustration.

— 128 —

Chucking Machine, Automatic

Gridley Machine Co., Hartford, Conn. [Vol.68,p.189]

A chucking machine designed to bore, turn, face, and form anti-friction bearing races and similar parts. It is of the single-spindle, work-revolving type. It has two tool-operating slides



having both semi-rotative and longitudinal movement, imparted simultaneously, though independently, by two cams which are interchangeable with others.

The cutting tools are carried at the free ends of short arms secured to the outer ends of the slides, and are advanced to the work tangentially by the semi-rotative movement of the latter. All working parts of the machine are inclosed, and are flood-lubricated.

The machine has a capacity to swing chucks up to 20 in. in diam., and handle work 8 in. in diam. Floor space 33x78 in.; weight 6,800 pounds.

— 129 —

Turning Machine, Bar

Medart Co., Columbus, Ohio. [Vol.68,p.440]

The bar-turning machine described on page 556, Vol. 62 of the *American Machinist*, made by the Brightman Brothers Co., Columbus, Ohio, is now being built by the company named above, which has purchased all the drawings, patterns, and good will of the former builders.

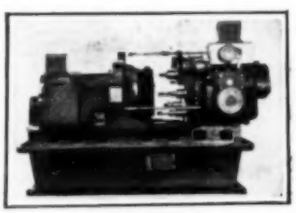
— 130 —

Chucking Machine, Multiple-Spindle, 11x10-Inch

Goss & DeLeeuw Machine Co., New Britain, Conn. [Vol. 68,p.669]

This machine is capable of handling work pieces up to 10 in. in diam., and the sliding turret has a maximum range of movement of 11 in. Four active spindles carry tools for drilling, boring, reaming, turning, facing and threading operations upon castings and forgings. The spindles are driven through a train of gearing so designed that the rotative speeds of all spindles (except the threading spindle) may be changed as a unit, and by substituting gears in another box the relative speeds of the several spindles may be regulated. With the constant-speed drive shaft running at 550 r.p.m., spindle speeds ranging from 25 to 460 r.p.m. are available.

The turret is indexed to five positions about a horizontal axis by means of a modified form of the Geneva movement. Indexing can take place only when the feeding cam is out of action. One idle position in which to



unload and reload chucks is provided. In line with the idle position is a hand-operated spindle to assist in centering the work pieces in the chucks.

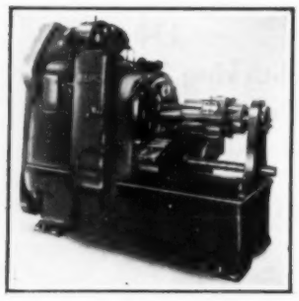
The threading spindle is driven through a separate train, which allows its rotative speed to be adjusted. Advance and withdrawal of the threading spindle are brought about by means of a master screw and nut of the same pitch as the thread to be cut. Power is transmitted by a constant-speed motor of from 10 to 15 hp. through silent chain.

— 131 —

Chucking Machine, Multiple-Spindle, Horizontal

Baird Machine Co., Bridgeport, Conn. [Vol.68,p.789]

Pieces not over 7 in. in diam., that can be held in a chuck, may be bored, turned or faced by means of this chucking machine of the work-rotating type. It has six spindles carried in a cylinder and a six-sided turret to which stationary tools or special devices having auxiliary movements may be secured. The turret does not index, but is moved horizontally by a drum cam. All of the mechanism is inclosed in the main housing where it is continuously oiled by the flood system. The loading station is at the front, and all controls are duplicated at the front and rear.



Front and rear slides for parting, forming and similar operations are located before the third and fourth spindles, respectively, and are operated by cams and levers. The main camshaft extends through the column so that a drum or face cam may be placed thereon to operate fixtures having auxiliary motion independent of the turret. Change gears provide suitable speed changes of the cycle mechanism.

The machine is chain driven by means of an electric motor mounted above the main housing.

Floor space 54x92 in.; weight 16,000 pounds.

— 132 —

Power Device, Screw Chuck

Goss & DeLeeuw Machine Co., New Britain, Conn. [Vol. 68,p.673]

To relieve the operator of the fatiguing job of tightening and releasing the chucks of chucking machines of its manufacture, the company mentioned above has developed a power-operated device. The device is mounted on the machine by a special bracket in such a position that the spade-handled socket wrench is in line with the screw of the chuck that is in loading position at the moment. To use it the operator advances the wrench spindle to engage the squared end of the chuck screw and depresses one or other of the pedals on the power unit.

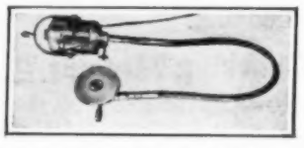
The apparatus consists of a special electric motor, a worm and wormwheel reduction gear and the pedal unit. The motor is designed so that it may be stalled under full load for a reasonable time without injury. The cycle mechanism cannot be started until the wrench spindle has been withdrawn.

— 133 —

Flexible-Shaft Unit, Suspended

Stow Manufacturing Co., Binghamton, N. Y. [Vol.68, p.554]

The unit may be suspended over the operation to be performed and swung out of the way as required. The flexible shaft is mounted in ball bearings, and is driven by a ball-bearing motor of 1 hp. It may be furnished to suit various requirements. The rotary motion is taken from an angle head or directly from the end of the shaft to drive rotary files, abrasive wheels, polishing wheels and other attachments.



— 134 —

"Flexishaft, Senior, AA"

Coates Clipper & Manufacturing Co., Worcester, Mass. [Vol.58,p.712]

Three speed ranges are incorporated. Screw driving is at 900 r.p.m., grinding and buffing at 1,725 and 3,450 r.p.m. Power is transmitted to the toolholder by means of a ⅜-in. high-carbon steel wire cable shaft, 4 ft. long. The spindle nose for carrying the tools has a ⅝-in. thread, 18 th. per in., for a chuck or other toolholder.

The device is driven by a ½-hp., 110-volt, single-phase, 60-cycle motor.

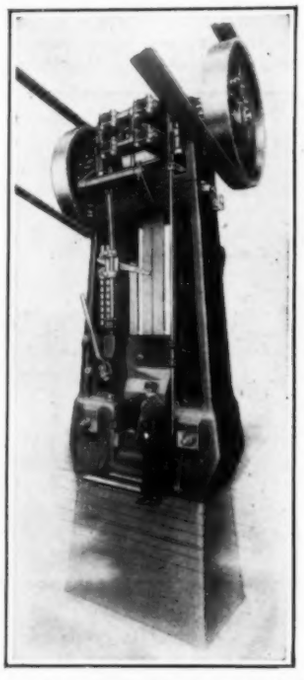
Weight is 62 lb. net.

— 135 —

Hammer, Board, Model E

Billings & Spencer Co., Hartford, Conn. [Vol.68,p.394]

The Model E hammer shown is made in sizes from 4,000 to 7,500 lb. To lift the ram two sets of rolls, with lifting action equalized, are used. Fullering, or edging, can be done without danger of destructive stresses. The twist in striking a blow on the edge of the die is taken up on the guides, the board being free to play crosswise between the rolls.



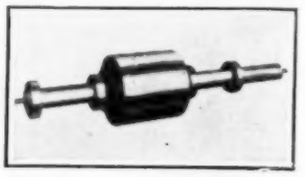
The hammer is of extra heavy construction, the uprights being steel castings. A knock-off provides for an adjustment to allow the hammer to work equally well on thick or thin dies. Friction adjustment on the rolls can be made from the floor.

— 136 —

Roller Bearing Heads, Hammer, Board-Drop

Chambersburg Engineering Co., Chambersburg, Pa. [Vol. 68,p.714]

Better maintenance of alignment and the elimination of interruptions of operation for oiling and changing bushings are the objectives of these roller bearing heads, designed for the board hammers manufactured by the company mentioned. A considerable saving of power can also be effected. These bearings may be packed so that good lubrication is insured over long periods.

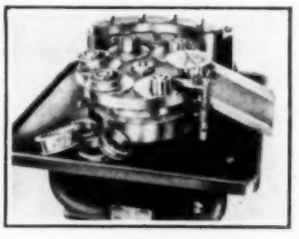


— 137 —

Marking Machine

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.68,p.558]

Marking on four different locations on the same ring is possible. The die-holder carries four marking dies. Pieces to be marked are placed on the stations of the dial; the dial revolves and carries the parts to the marking dies, and then unloads them automatically.



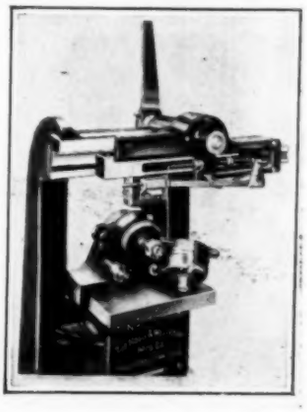
Various tubular parts made of thin materials can be marked without distortion, and a production of 100 pieces per min. can be obtained. The machine is motor-driven and weighs 425 pounds.

— 138 —

Marking Machine, Special, No. 3

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.68,p.867]

Serial numbers may be pressed upon curved surfaces by means of this hand-operated machine. The automatic tripping device is attached to the numbering head



and changes the serial numbers.

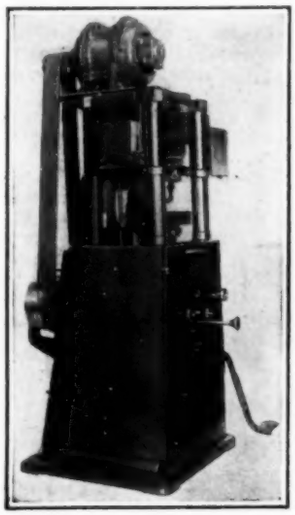
Marking of the serial number is accomplished by the forward stroke of the numbering head. By disengaging the tripping device the wheels in the numbering head can be operated independently.

— 139 —

Marking Machine, Hydraulic, No. 14

Martin Machine Co., Turners Falls, Mass. [Vol.68,p.908]

A machine for marking, knurling, or scoring articles requiring heavy pressures by means of a roller passing horizontally over the work. Pressure is applied by means of a



hydraulic mechanism. The machine is self-contained, power to operate it being supplied by an electric motor mounted above the machine.

The base forms a reservoir to contain the oil which is delivered under pressure by a rotary pump. The work is held in fixtures upon a table that traverses from left to right.

The cycle may be made continuous by locking the treadle, and the speed of the cycle is adjustable. The table can be caused to pass back and forth any number of times without blurring the lines on work requiring heavy impressions.

Weight, 2,000 lb.; floor space, 36x36 inches.

— 140 —

Numbering Head, Double, Special

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.68,p.394]

This numbering head is intended to reduce the cost of numbering name plates. The six wheels at the left work automatically for serial numbering. The wheels at the right are changed by hand as required. These wheels mark such

information as catalog numbers, model numbers, dates and other data.

— 141 —

Polishing Machine, Straight-Line, "Larson"

Hanson-VanWinkle-Munning Co., Matawan, N. J. [Vol.68, p.750]

Automatic polishing of large flat articles may be done. Lifting cams for irregular shapes, rotating fixtures for circular

work, and spinning fixtures for bolt heads can be provided.

Interlocked cast-iron platens form the work table. The polishing-wheel spindles are adjustable to any pressure and oscillate over the work, and the spindle yokes may be set so that each wheel will polish or buff out the marks left by the preceding wheel. Any number of polishing wheels can be used, as the machine is built on a sectional basis.

Polishing wheel spindles may be driven by motor or overhead countershafts. Texrope drive can be furnished. Each spindle requires 3 hp., and the platen drive from 1 to 2 horsepower.

Floor space, 3x14 ft.; weight, 4,500 pounds.

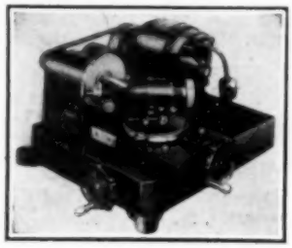
— 142 —

Refacer, Valve, Model F, Van Norman

Van Dorn Electric Tool Co., Cleveland, Ohio. [Vol.68,p.233]

In this machine a double-grip collet chuck is featured. It secures the valve in two places, 3 in. apart. The range of the chuck is for stems from $\frac{7}{16}$ to $\frac{1}{2}$ in. in diam. Accuracy within 0.0001 in. is guaranteed. Valves with head diameters up to $4\frac{1}{2}$ in. can be refaced to any angle from 30 to 50 degrees.

A diamond-pointed dressing tool is provided. V-blocks on top of the workhead make it possible to resurface the tappet



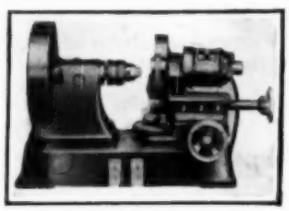
seat at the end of the valve stems. Valve reseating tools can also be sharpened. A special attachment can be furnished for grinding rocker arms.

— 143 —

Refacers, Valve, Models A and B

U. S. Electrical Tool Co., Cincinnati, Ohio. [Vol.68,p.239]

Model A is permanently set to grind valves of 45-deg. angle, Model B is adjustable to any angle up to 90 deg. Each model has two motors for either direct or alternating current: One operates the abrasive wheel and



the other turns the valve spindle. Belt drive can be furnished.

Regular equipment includes a wheel dresser, a V-block for truing valve-stem ends, a cutter-resharpening indexing support, and connections.

— 144 —

Riveters, Single-Purpose

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.68,p.556]

These riveters are known as the "Push-Type Chassis-Frame Riveter," and the "Tractor-Wheel Riveter." Both machines are pneumatically operated for cold riveting.

The chassis-frame riveter (illustrated) is intended to secure the cross members to the web of the side bar and to secure step-hanger brackets to the frame. The design permits riveting on both sides of the chassis frame. The machine has 3-in. reach, 7-in. gap, $2\frac{1}{2}$-in. die stroke, and is available in 15- and 20-ton capacities for driving $\frac{7}{16}$- or $\frac{3}{8}$-in. rivets cold.

The tractor-wheel riveter cold

heads two $\frac{3}{8}$-in. rivets, which secure the spoke to the rim with each stroke, and is adjustable for tractor wheels 32 to 56 in. in diameter.

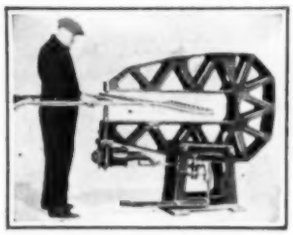
— 145 —

Riveter, Aircraft-Frame

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.68,p.910]

Heading-over rivets in a bulky Duralumin frame is the field of this machine. The reach is 45 in. and the gap 10 inches.

When the ram is operated under an air pressure of 100 lb.



per sq.in. and the die stroke is $1\frac{1}{2}$ in., $\frac{3}{4}$-in. rivets can be driven. A ram speed of 60 strokes per min. is obtainable. The machine is operated by a foot-actuated valve.

This equipment is being offered in a wide range of sizes for either portable or stationary use

— 146 —

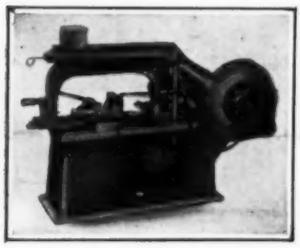
Power Saw, Production

Robertson Machine and Foundry Co., Buffalo, N. Y. [Vol.58, p.553]

A power hacksaw with a capacity of 9x9 in. and frame speeds of 72 or 100 strokes per min. The clutch automatically disengages when the cut is competed.

An oil-compression valve lifts the frame to relieve the blade of back drag.

The vise, of the quick-acting type and adjustable from 0 to 9 in., may be swiveled 45 degrees.



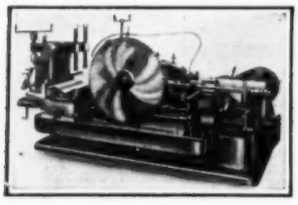
Drive is by ¾-hp. motor. Floor space 26x62 in.; height 41 in.; weight 700 pounds.

— 147 —

Sawing Machine, Metal, 48-Inch

Cochrane-Bly Co., Rochester, N. Y. [Vol.68,p.1064]

A machine designed for either 42- or 48-in. saws, to cut up to 15-in. and 18-in. bars, respectively. Twelve changes of gear



feeds, ranging from ¾ to 3¾ in. per min., can be obtained. A sliding gear transmission gives speeds of 45, 60 and 75 ft. per minute.

A constant-speed, 25-hp. motor drives the machine through a friction clutch. Stopping, feed reverse, and quick return of the carriage are automatic.

Floor space: belt-driven 69x141 in.; motor-driven 84x141 inches.

— 148 —

Reseating Machine, Outlet-Valve, Tank-Car, Dexter

Leavitt Machine Co., Orange, Mass. [Vol.68,p.867]

Reseating of outlet valves may be carried out without removing them from the tank car on this

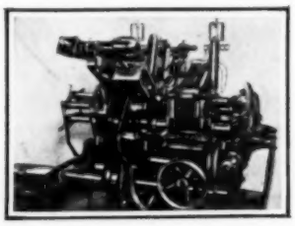
one-man machine, made in two sizes, for 4- and 6-in. valves. The device consists of a universal chuck for centering and holding the valve, and a chuck back used as a guide for the cutter. The feed is positive.

— 149 —

Screw Machine, Automatic

Davenport Machine Tool Co., Rochester, N. Y. [Vol.68,p.790]

In the machine illustrated the work remains stationary while the tools revolve. The tools are arranged around the work radially in five positions. Each



tool has an independent feed, which may be adjusted.

No operation is completed by one tool. In the case of drilling a deep hole it may be drilled half-way by the first tool and rotated to the second tool for the second half of the operation. It is rotated further to the third tool for reaming. In general, the machine is designed on the principle of dividing operations to reduce the total time of the cycle.

— 150 —

Rod Magazine, Automatic, for Screw Machine

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.68,p.672]

This external feeding mechanism has been developed for use with the No. 00 automatic screw machines manufactured by this company. The mechanism consists of an arrangement holding several rods at the left end of the machine, replacing the stock stands generally used. When in use, the next rod is automat-

ically fed into the working position as the preceding rod is exhausted.

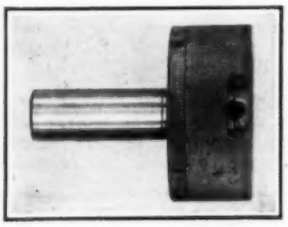
The mechanism is connected with the feeding arrangement of the screw machine in such a manner that, at the instant the last piece is cut off, the machine is stopped as power is delivered to the rod magazine. A rod is dropped into the feeding position, and then pushed forward to the desired position. The machine is then automatically thrown into engagement, and the magazine thrown out of engagement.

— 151 —

Tool Holder, Floating, Type B.S., for Screw Machine

Scully-Jones & Co., 1901 S. Rockwell St., Chicago, Ill. [Vol.68,p.990]

This floating tool holder is especially designed for use on small automatic and hand screw machines where clearance is



limited. The construction is very simple, permitting collets to be quickly changed for various size tools. Friction has been practically eliminated by the use of ball thrusts between hardened and ground surfaces. The couplings employed insure a positive drive for collets without interfering with the floating action. This action permits taps and reamers to enter work on a straight line when the machine spindle and turret tool holders are off center but in parallel alignment.

— 152 —

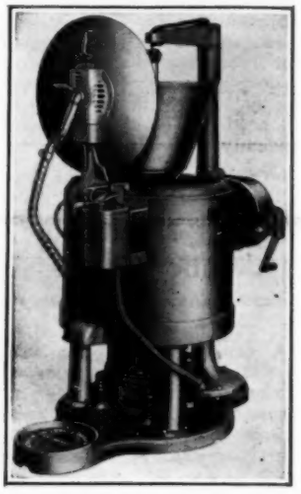
Washing and Drying Machine, "Typhoon," No. 500W

Leon J. Barrett Co., Worcester, Mass. [Vol.68,p.199]

This washing and drying machine was developed for the purpose of washing and drying screws and other screw-machine products not too large to lend themselves readily to balancing in a rapidly revolving basket. The machine is self-contained, and is driven by a flexibly-mounted vertical electric motor, on the extended rotor shaft of which the basket is carried. The motor may be run in either direction.

The washing liquid is delivered to the center of the revolving basket, and the amount may be controlled manually or mechanically. The liquid can be used repeatedly.

A hinged cover closes the chamber, and is interlocked with the control lever. A perforated



grid plate at the center of the cover admits air to dry the parts after the solution has been run off. An electrically-heated "Cyclone" grid dryer may be substituted for the perforated grid plate.

A hand-operated crane is supplied. The machine is built in two sizes to hold 1,440 and 3,824 cu.in. respectively. The larger machine weighs 1,500 lb. and occupies a floor space of 31x54 in. The smaller machine weighs 750 lb. and covers 25x36 in. of floor space.

— 153 —

Lapper, Single-Spindle, No. 12

Moline Tool Co., Moline, Ill. [Vol.68,p.234]

The automatic features used on the Moline multiple-spindle lapper by which the spindle makes a predetermined number of strokes and then withdraws and stops, are optional on this unit.

A large base is used for a reservoir and settling tank and the pump has a capacity of 30 gal. per min. The pan table has a working surface of 35x45 in., and to it the proper fixtures can be attached.

The drive can be either by motor or belt. The multiple-disc clutch used incorporates a brake.

The reciprocations of the slide carrying the spindle are obtained by an Oilgear pump and cylinder. The stroke can be set for any length up to a maximum of 24 in., and the rate of reciprocation may be varied. All reciprocating parts are made of aluminum. The slide can be set to give a maximum distance from the spindle nose to the table of 47 inches.

Shipping weight is 6,900 lb. approximately.

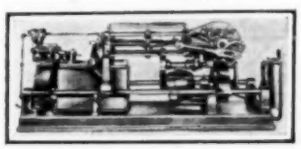
— 154 —

Die Casting Machine

Madison-Kipp Corporation, Madison, Wis. [Vol.68,p.275]

The die-casting machine illustrated is now being built for general distribution. The company also offers complete die-casting service.

One of the important features of the machine is completely-automatic operation with safety features covering the movement of the metal, movement of the



die and movement of the cores. The only functions of the operator are to manipulate the single clutch lever, supply new metal and clean and oil the die with an air hose. The machine can be stopped with the die in any position and reversed from any position. Standard zinc and aluminum-base metals may be used in the machine.

The machine and dies are so constructed that the cores can be pulled only in the proper order and metal cannot be shot unless the die is closed and the "goose-neck" is in the casting position. The stationary half of the die is attached to the hot plate of the machine while the movable half is mounted on a reciprocating carriage.

The machine is equipped with a fire-brick lined, cast-iron furnace, and a cast-iron pot. Both are removable.

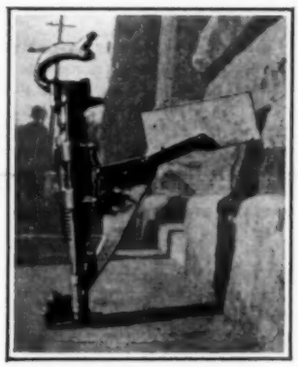
Floor space 120x34½ in.; height 51 in.; weight 6,800 pounds.

— 155 —

Nailer, Automatic, "Triplex"

Duplex Automatic Nailer Co., Logansport, Ind. [Vol.68,p.554]

Three nails may be simultaneously driven on center distances of 1¾ in. by this machine. The



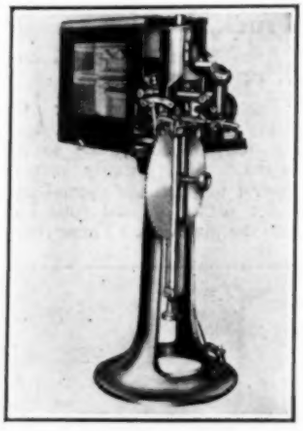
rate of driving is 60 nails per min., while an hourly production will fall between 3,000 and 3,600 No. 8 cement-coated or common nails. It is not necessary to place the nails in the hopper in any particular arrangement. As three nails are driven, three more are released and fall into the nail pockets. When the machine is moved to the next point, the hammer is raised sufficiently to allow the nails to fall into the tubes. The hammer is then lowered and air pressure admitted. It is claimed that no nails are bent in driving.

— 156 —

Saw Filer, Circular, Double-Acting, Model F

Wardwell Manufacturing Co., Cleveland, Ohio. [Vol.68,p.556]

So that circular cross-cut saws and rip saws may be filed in the direction in which the teeth are set, the Model F double-acting circular saw filer has been introduced. The machine will handle circular saws from 4 to 18 in. in diam. with teeth up to ½ in. from point to



point. The teeth may be jointed and filed at the rate of 70 per min. Cross-cut saws automatically swivel, and each tooth is beveled at any amount from zero to 40 degrees.

The main drive shaft runs on Timken roller bearing. A swiveling head, to which a saw vise is attached, turns the cross-cut saw alternately right or left to the amount depending upon the bevel desired. An automatic tightener grips the saw during the file stroke and releases it as the filing arm raises. The amount of cut can be regulated.

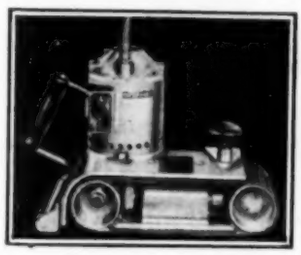
The machine makes use of standard, double-end taper files, and is furnished with a ¼-hp., single-phase a.c. or d.c. motor, that is direct connected.

— 157 —

Sander, "Take-About"

Porter-Cable Machine Co., Syracuse, N. Y. [Vol.68,p.715]

Smooth finishes on both flat and slightly-curved surfaces may be obtained by the use of this "Take-About" sander. The device makes use of endless abra-



sive belts, which can be furnished for cutting either wood or metal.

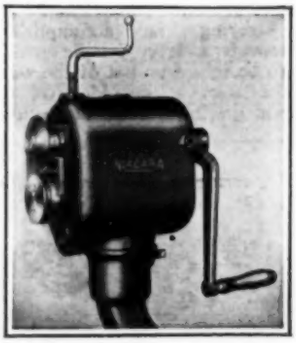
The machine is equipped with a 1-hp. motor of the universal type for use on either 110- or 220-volt, a.c. or d.c. circuits. The rear pulley, over which runs a 4x27 in. belt at 2,000 ft. per minute, is driven by a worm and gear, totally inclosed. The equipment includes six belts, felt-covered shoes and 15 ft. of rubber-covered cable.

— 158 —

Sheet Metal Machine, Bench Combination Heavy, No. 147-C

Niagara Machine Tool Works, Buffalo, N. Y. [Vol.68,p.708]

Three interchangeable hardened steel rolls have been designed for the single operations



of burring, turning or wiring soft steel sheets up to No. 18 gage on this No. 147-C heavy combination bench machine. Back gearing and a one-piece inclosing frame are other features of this metal-working machine.

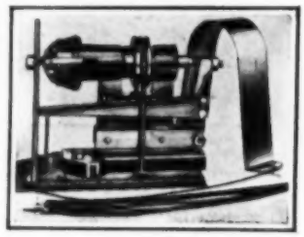
The machine is furnished complete with three pairs of rolls and is mounted on a heavy bench stand. However, it may be supplied as a single purpose machine with but one set of rolls.

— 159 —

Wire Stripper, Centrifugal

C. B. Mahan, 162 Longview Terrace, Rochester, N. Y. [Vol. 68,p.791]

Insulation may be stripped from wire of all sizes without cutting into the strands, by means of this centrifugal wire stripper. The machine is of the high-speed type, and it is claimed



to give a production of 2,500 ends per hour.

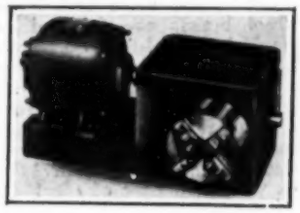
The centrifugal action closes the jaws of the machine under a definite pressure to the gage which has been set to the proper opening for the size of wire. The jaws are equipped with three small steel circular cutting disks which may be turned slightly to present new cutting surface when desired.

— 160 —

Reamer Drivers

Greaves Machine Tool Co., Cincinnati, Ohio. [Vol.68,p.791]

These reamer drivers hold reamers of the larger sizes by means of the four-jaw universal chuck. The machines are built in both single- and double-speed types. The reamer driver is started at either 30 or 60 r.p.m. by pressing a foot-operated switch. The work, which is held in both hands, is run on and off the tool. The machine is then stopped by releasing the



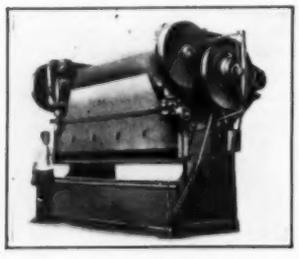
pressure on the foot switch. Speed reduction is obtained through spur and worm gearing, which run in oil lubricating the bearings by splash. The thrust from the motor is taken by ball bearings, whereas all other shafts are bronze-bushed.

— 161 —

Press Brake, All-Steel, No. 120

Cincinnati Shaper Co., Cincinnati, Ohio. [Vol.68,p.829]

Right angle bends in ⅜-in. steel plate, 8 ft. long, over a 3-in. die opening, or in ¼-in. plate, 12 ft. long, over a 2-in. die opening, can be made in one stroke with the No. 120 series all-steel press brakes. The machines range in size from 6 ft. 6 in. between housings, with a



die length of 8 ft., to 12 ft. 6 in. between housings, with a die length of 14 feet.

The housings are made of a single plate, 4½ in. in thickness, instead of a double-plate box construction, while the bed and ram plates are 3-in. thick. The bed extends below the floor line from 18 to 28 in., depending upon the length of the machine.

Due to the method of mounting the bed and the divided connecting rod, the loads are carried directly up and down the center line of the housings. This feature tends to reduce deflection and at the same time gives greater capacity.

Other refinements are automatic oiling, anti-friction bearings on high-speed shafts and in the hub of the flywheel, special disk clutch, large over-size brake drum, liberal depth of bed and ram plates, and screws of high-carbon, high-nickel steel, cut with buttress threads. In addition, a dovetail slot is planed along the length of the bed, both front and back, for attaching gages or other fixtures.

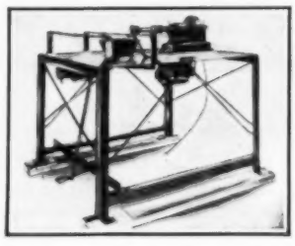
The ram is raised and lowered by means of an independent motor drive, which is standard equipment. Main drive is by motor connected to the flywheel by a Texrope drive.

— 162 —

Nut-Driving Machine

Procunier Safety Chuck Co., 18 S. Clinton St., Chicago, Ill. [Vol.68,p.1064]

This machine, which is used for driving or removing nuts, consists of a Procunier bench tapping machine mounted upon a special table equipped with a socket wrench and with a safety friction clutch. When the nut is driven home, the friction of the clutch is overcome by the



resistance of the lug on the chuck head. Protection against damage to the machine, should the friction become too high, is afforded by an electrical overload switch. The direction and rotation of the spindle may be reversed to back off a nut, by tripping the foot treadle to engage the reversing clutch. Nuts that have been backed off fall through the hopper into a container placed upon the floor.

Material Handling Equipment

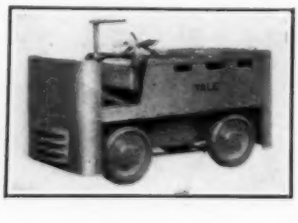
— 163 —

Tractor, Model K24C, Yale

Yale & Towne Manufacturing Co., Stamford, Conn. [Vol. 68,p.191]

Four-wheel drive and four-wheel brakes are featured in the Yale Model-K24C Tractor. This heavy-duty machine is capable of an ultimate draw bar pull in excess of 4,000 lb., depending upon the road surface conditions. It will exert a continuous draw bar pull of 1,000 lb. without danger of overheating. The four-wheel brakes operate through differentials so that they equalize regardless of the condition of the lining.

Steering is accomplished through a lever handle which can be folded up out of the way. The steering knuckles on all four driving wheels are equipped with ball thrust bearings to make easy steering.



The motive power is derived from two standardized units connected in parallel at the controller. A 48-volt motor and a 23-to-1 gear reduction are furnished regularly. A triple bumper casting both front and rear gives a range of coupling height to meet all practical requirements.

— 164 —

Elevating Truck, Single-Lift, Type R

Lewis-Shepard Co., Watertown Station, Boston, Mass. [Vol.68,p.397]

These two series of single-stroke lift trucks have an effective lifting range of 180 deg., and great mechanical advantage.

One of the important features is that the lifting mechanism is constructed so that the handle is never disengaged from the load.

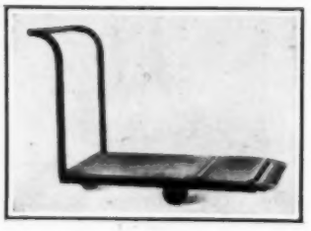
The amount of lift is 1¾ in. for either series. The Type R has a minimum platform width of 22 in. and a maximum of 36, while in the Type WR the minimum platform width is 28 and the maximum 46 in. The lowered height varies from 6 to 9 in. The capacity of all models is 2,500 pounds.

— 165 —

Truck, Utility

Lyon Iron Works, Greene, N. Y. [Vol.68,p.557]

Features claimed for this utility truck are ease in loading and unloading due to low height, tilting easily accomplished to push the special nose under packages, and rolls built into the platform. These trucks



are used for moving tote boxes or crated machinery.

The truck is made with a platform 22x32½ in., while the height of the platform is 5 in. above the floor. The nose, which is made of ¼-in. steel plate, has a length of 3 in. The handle, which is 30 in. above the floor, is made low to enable operators to reach over it when desired.

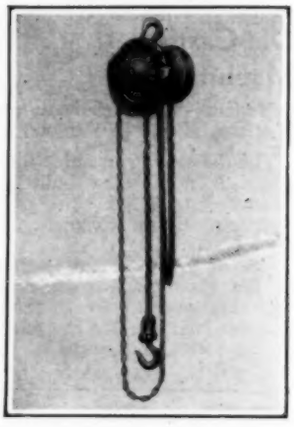
Capacity, 500 lb.; weight, 100 pounds.

— 166 —

Hoist Chain, Electrically-Welded

Ford Chain Block Co., Philadelphia, Pa. [Vol.68,p.478]

Every link in this high-carbon, electrically welded chain is proof-tested with special instru-



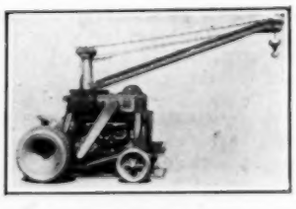
ments, and when the chain is assembled, it is again tested and must stand an overload of 50 per cent above its rated capacity. The chain is used on the Ford "Tribloc" chain hoists built in capacities from ½ to 20 tons.

— 167 —

Swing Crane, "Loadmaster"

Frederick H. Poor, Inc., 50 Church St., New York, N. Y. [Vol.68,p.1071]

This movable power crane unit can handle loads over a radius of 10 ft. from the mast center. All operations, such as



traction, boom swing, and boom lift are performed by power from the tractor engine, and all controls are within reach of a single operator. Weighted wheels at both the rear and front counterbalance loads in suspension from the boom.

The frame upon which the mast is located is suspended at the front in such a way as to compensate for irregularities in the roadbed. The hoisting drum

is directly connected to a self-locking worm gear.

The bull wheel by which the boom is swung about the mast is power driven by means of a chain and sprocket, and is equipped with an expanding brake of such design that the boom can be controlled in its swing, or set in any fixed position. The full-swing arc of the boom under load is approximately 240 deg. Adjustable telescoping outriggers allowing heavier loads to be swung over the sides can be furnished.

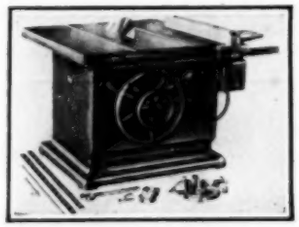
Woodworking Machines

— 168 —

Saw, Woodworking, Miter, Tilting-Arbor, No. 88

Oliver Machinery Co., Grand Rapids, Mich. [Vol.68,p.238]

In this circular sawing machine the working top of the table remains horizontal while the saw arbor can be tilted to any desired angle up to 45 deg. to enable the operator to either rip, crosscut, miter or dado. The standard machine will rip



work up to 30 in. wide either in the square or the angular position.

Either a plain table or a universal table having a rolling section can be furnished. The plain table is 44 in. long and 40 in. wide in the main portion with an 18-in. extension arranged for either side. The universal table has a 15-in. rolling section to the left of the saw. The rolling table may be moved 4 in. from the saw, permitting the use of dado saws and special heads. With the rolling table, crosscutting, mitering and grooving on work up to 36 in. wide can be done.

The 5-hp. motor is mounted directly on the saw arbor, which is carried on ball bearings. The motor housing has vertical gibbed slideway with a total of 4½ in. up-and-down movement.

A universal ripping fence, a miter cut-off gage, and two universal gages are supplied.

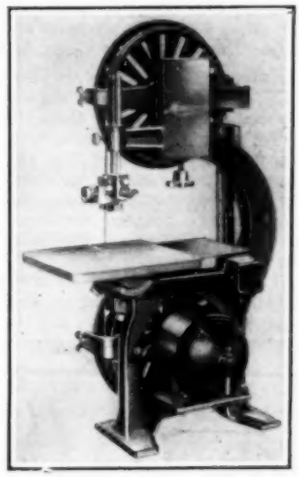
Weight, 2,200 lb. crated.

— 169 —

Band Saw, Bench, "Monarch"

American Saw Mill Machinery Co., Hackettstown, N. J. [Vol. 68,p.517]

Safety features, such as locking, hinged wheel guards, have been incorporated in this machine. A large, tilting table and



a smaller, stationary table behind it are provided. Twisting of the blade is avoided by the adjustable lower guide, and an upper roller guide. A 6-in. clearance between the guide and the table provides room for large stock.

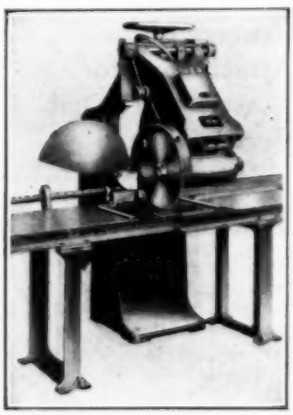
This machine measures 36 in. in height. Either a.c. or d.c. motors are available, or belt drive can be used.

— 170 —

Cut-off Saw, "Straitline," No. 94-D

Oliver Machinery Co., Grand Rapids, Mich. [Vol.68,p.633]

A suspended-link motion is used that permits folding the entire mechanism into the head; it is designed to prevent rebounding of the saw into the working zone. The suspended-



link mechanism is carried by a yoke with gibbed way, and has a 3-in. vertical adjustment to compensate for wear in saws or the use of saws of different diameters.

Drive is by a 5-hp. motor mounted directly on the saw arbor, running at 3,600 r.p.m. on either 2- or 3-phase current. The circuit used may be 220- or 440-volt at 60 cycles. The motor head will accommodate circular saws, dado heads, or solid cutters from 10 to 18 in. in diameter. The machine has a capacity for stock 2 in. thick, 20 in. wide.

Tables for use in connection with the saw are 20 in. wide, 31 in. high and 16 ft. long. The weights of the machine and table, crated, are 1,400 and 700 lb., respectively.

— 171 —

Hand Saw, Electric, Portable, High-Speed, Type B

Wodack Electric Tool Corporation, Chicago, Ill. [Vol.68, p.515]

Features of this machine are a tilting saw which can be set and locked at any angle up to 60 deg., and a width gage for

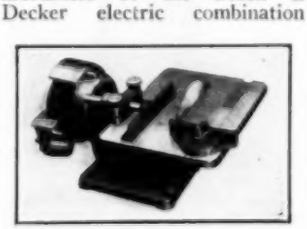
vertical sawing which can be set for any width from 0 to 6 in. By means of the tilting-saw base, double sawing may be accomplished. This machine is supplied with a universal motor for 110, 220 or 250 volts. Each machine is furnished with one 11-in. and one 9-in. saw.

— 172 —

Saw Table, Electric

Black & Decker Manufacturing Co., Towson, Md. [Vol.68, p.516]

Extension of the scope and usefulness of the Black & Decker electric combination



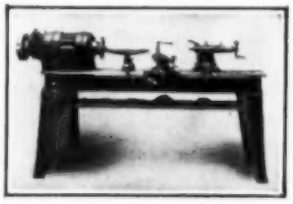
grinder is made possible by this saw table. Work can be sawed on any angle up to 45 deg., and the table may be raised or lowered to fit requirements. Wood can be sawed up to 1¾ in. in thickness; aluminum, brass, copper, Bakelite, and fiber can be handled.

— 173 —

Lathe, Woodworking, Motor-Headstock, Multi-Speed

J. G. Blount Co., Everett, Mass. [Vol.68,p.197]

Simplicity and compactness are features of this 2-hp. motor-headstock lathe which has been developed particularly for use in pattern shops. The motor headstock is of the squirrel-cage multi-speed type,



fully inclosed and dust proof. Each speed is constant during load and develops full rated power.

The main spindle is bored with a ¾-in. hole, and is fitted with a No. 3 Morse taper. The spindle speeds are 575, 1,160, 1,725, and 3,450 r.p.m. The jack spindle has speeds of 287, 580, 862, and 1,725 r.p.m. This jack spindle is of use in turning work of larger diameter than the swing of the lathe. Both spindles run in ball bearings.

The bed can be furnished in 6-, 8-, 10-, and 12-ft. lengths. The saddle and apron are gibbed both front and rear to prevent vibration. The setover tailstock has a screw and lever feed and is mounted on a swivel base.

— 174 —

Surfacer, Single-Cylinder, No. 560

J. A. Fay & Egan Co., Cincinnati, Ohio. [Vol.68,p.864]

Both hard and soft wood may be given a high-grade finish by this electrically driven, single-cylinder surfacer. It will handle stock up to 24 in. wide and 8 in. thick.

The finishing is accomplished by means of a single cylinder which is fitted with three tung-

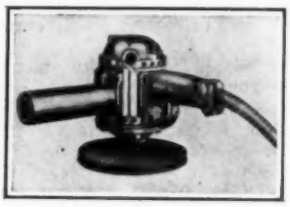
sten steel knives. Micrometer-adjusting screws in the head control their accurate setting. The cylinder rotates at 3,600 r.p.m. and is driven by a 5-hp., 2- or 3-phase motor, mounted directly upon it.

— 175 —

Sander, Electric

Black & Decker Manufacturing Co., Towson, Md. [Vol.68, p.518]

This machine is driven through a train of heat-treated steel gears running in a grease-tight compartment. The motor and all revolving shafts are mounted in ball bearings. The machine



is operated with a pistol grip and trigger switch, and can be supplied for all usual voltages.

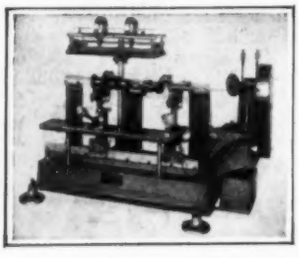
Balancing, Gaging and Testing Equipment

— 176 —

Balancing Machine, Dynamic, Centrifugal, "Olsen-Lundgren"

Tinius Olsen Testing Machine Co., Philadelphia, Pa. [Vol.68,p.906]

Several additional features have been incorporated in the improved model of the Olsen-Lundgren centrifugal dynamic balancing machine, illustrated. The supports for the rotor to be balanced are designed to oscillate freely for obtaining cor-



rect alignment. A new type of coupling is used, so that any ordinary unalignment between the spindle and the piece tested does not interfere with the accuracy of the reading. Each support is provided with a quick-locking mechanism to facilitate taking the reading of unbalance at either bearing so that the one support will be entirely free from the other.

A transfer instrument makes possible the correct reading of the amount of unbalance in ounce-inches and the angular plane of unbalance required at selected points of correction from readings taken at the bearing support. It does away with the necessity of making computations and preparing large numbers of charts. The angle of unbalance is read on the dial, and the force introduced to counteract the centrifugal force of the unbalance can also be read directly.

The improved dynamic balancing machine is available in any desired size suitable for balancing very small rotors of ½ lb. in weight up to the largest size turbine rotors. It is made to suit different lengths and classes of work, and any specified graduation other than ounce-inches can also be furnished. No outside wiring is required.

— 177 —

Balancers, Static, 12-, 24- and 36-Inch

Gisholt Machine Co., Madison, Wis. [Vol.68,p.558]

These static balancers in 12-, 24-, or 36-in. sizes have been provided with a lead screw for the adjustment of the spindle for drilling balancing corrections at various radii. Either belt or direct-motor drive is

available in either ½- or 1-in. drill size capacity.

The 12-in. machine, which is very sensitive and capable of detecting very small amounts of unbalance, is suitable for service on small high-speed light work such as clutch parts, small fans, and small flywheels containing magneto magnets. Work such as large flywheels, heavy grinding wheels and other large-diameter narrow-faced parts may be balanced on the 24- and 36-in. machines, which are sufficiently rugged to support the heavy weights encountered.

— 178 —

Indicator Gage, Krupp

Coats Machine Tool Co., Inc., 108 W. 40th St., New York City. [Vol.68,p.236]

Extreme accuracy with clear and easy optical reading is claimed for the gage made by Fried. Krupp, A.G., Essen, Germany, and marketed in this country by the above company. By various attachments, the gage may be adapted for measuring practically all forms of regular commercial work.

The gage works on the comparative principle; that is, it is first set to a master and by application to the work shows

any deviation from nominal size. It can indicate to 0.00004 in. High and low limits are shown by two adjustable red indicators.

For parallel cylindrical work the standard complete gage has an adapting unit of saddle form. The saddle carries renewable and interchangeable locating plates of steel, which are relieved to insure a positive seating on the work. For checking broken surfaces such as the leads of a spiral reamer, the angle of the saddle faces are in accordance with the number of flutes.

It is also possible to check external and internal threads, the thickness of worm gear teeth, the pitch of taps, external and internal tapers, and bored work during production.

— 179 —

Centering Attachment for "Last Word" Dial Test Indicator

A. G. Schwieterman, 109 Illinois Ave., Dayton, Ohio. [Vol.68,p.276]

An attachment for use in centering holes and buttons on jig boring machines and milling machines has been developed for use with "Last Word" dial test indicator made by Henry A. Lowe, 1874 E. 66th St., Cleveland, Ohio.

The spindle of the attachment is rotated with the spindle of the machine at the speed of the boring operation, while the test indicator itself is held stationary. With some practice it can be centered within 0.0001 in., in 15 to 20 seconds.

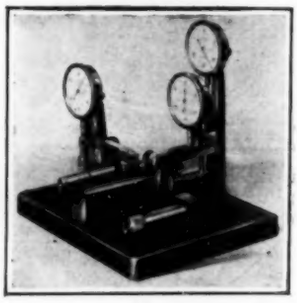
All parts of the attachment are hardened and all moving parts are ground and lapped. Three quickly changeable feeler fingers are available. No. 1 size is for holes up to ¾ in. in diam., No. 2 for ¾- to 1½-in. and No. 3, 1½- to 3-in. holes.

— 180 —

Gages, Special

B. C. Ames Co., Waltham, Mass. [Vol.68,p.317]

This single-purpose instrument is used to measure the O.D. of a valve stem bushing, the I.D., and the eccentricity of the I.D. with respect to the O.D. These three dimensional char-



acteristics are obtained to a precision of 0.0005 inch.

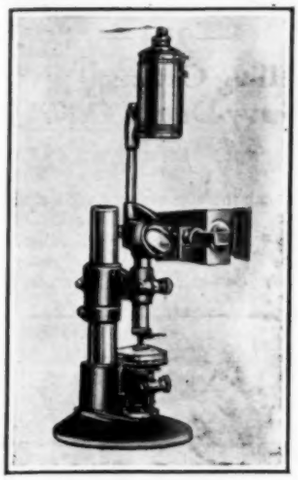
The valve stem bushing is placed on the V shown, and is encompassed by a double lever, connected to two dial micrometers, one point of the double lever contacting with the bore of the bushing, the other with the top. Another lever, diametrically opposite, contacts on the bottom. When the valve stem bushing is revolved in the V, eccentricity is tested. The lever shown at right angles to the longitudinal axis of the valve stem bushing contacts the outside of the bushing and registers the O.D. on a third micrometer.

— 181 —

Optimeter, Projection, Zeiss

George Scherr Co., 142 Liberty St., New York, N. Y. [Vol.68,p.713]

Mass inspection is facilitated by means of a visible reading scale recently incorporated in the Zeiss Projection Optimeter. This has been accomplished by a change of the optical tube



allowing a lamp holder as well as a screen attachment to be fitted to it. The image of the scale, as it is formed in the ocular, is transmitted through a set of prisms and projected upon the screen. Observation of the reading on the screen is available to two or more persons at the same time so that checking may be accomplished.

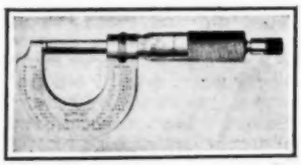
The graduation of the scale is 0.00005 in., and 0.00001 in. may be estimated easily. Other improvements are a table with a serrated surface and an increased range of scale to plus and minus 0.005 inch.

— 182 —

Micrometer, Rapid-Reading

Lufkin Rule Co., Saginaw, Mich. [Vol.68,p.558]

Each thousandth marked on this tool is numbered consecutively up to twenty-five with every five-thousandth number



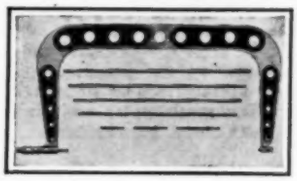
showing more prominently. This simplifies the reading, and assists very much in eliminating mistakes, as it is only necessary to add the figure showing at the reading line on the sleeve to the last twenty-five thousandth line showing on the hub of the micrometer.

— 183 —

Micrometers, Nos. 90, 91, and 92

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.68,p.714]

These three micrometer calipers, Nos. 90, 91, and 92, have a combined range of 12 in. covering all sizes from 12 to 24



in. by thousandths. The range of measurement of each tool is obtained by four interchangeable anvils of different lengths which are held positively in place by knurled nuts. Each anvil has a means of adjustment for wear. A clamp ring and four standards are provided with each caliper.

— 184 —

Micrometers, Nos. 60, 62, and 276

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.68,p.1063]

The Nos. 60 and 62 micrometers measure from 1 to 2, and from 2 to 3 in., respectively, by thousandths. Both micrometers are equipped with solid anvils and have simple adjustment for

wear of the measuring surfaces. They may be furnished with or without standards, and with or without ratchet stops. They do not have clamp rings.

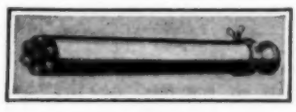
The No. 276 inside micrometer is made in three sizes to measure from 12 to 22 in., 22 to 32 in., and 32 to 42 in. by thousandths. The range of each micrometer is obtained by ten changeable anvils of different lengths. The measuring points are hardened and the faces are ground at a radius.

— 185 —

"Borescopes"

Herman A. Holz, 17 Madison Ave., New York City. [Vol.68, p.73]

Inside surfaces of long, hollow, metallic bodies such as gun and rifle barrels, compressed-gas steel cylinders and long



borings in castings can be examined by the "Borescope" portable optical inspection instruments.

A comparatively long metal tube carries the source of electrical illumination and contains a suitable optical system. The length of the instrument is determined by individual requirements. The main function of the special optical system provided is to create a panoramic image in natural colors with maximum contrasts, so that slight structural differences are clearly brought out and may be easily observed.

The maximum length of the instrument developed so far is about 17 ft. If the hollow space is a blind hole, some types of Borescopes permit an examination of the bottom surface in addition to that of the walls.

The type No. NA Borescope will just clear a 1½ in. bore. The type No. WA Borescope illustrated covers the relatively wide angle of 120 deg. of the objective. This type can be used in the examination of holes 2½ in. or larger in diam., and up to 17 ft. depth. "Rifle" Type FS was developed for examining the bore of rifle barrels. This particular type is usually supplied with a 5 or 7 mm. outside diameter and with a length of 60 cm. The instrument produces a clear and distinct panoramic image that can be photographed.

— 186 —

Hardness Tester, "Vari-Rest" Attachment, Rockwell

Wilson-Maculen Co., Inc., 369 Concord Ave., New York City. [Vol.68,p.478]

This adjustable jack support was designed to provide additional support for a great variety of shapes and sizes being tested on the Rockwell hardness tester. The illustration indi-

cates one of the many possible uses. The basic idea is to support the piece so that it does not slip, roll, or in any way shift during the application and withdrawal of the minor and major loads. Failure to do so may result in damage to the diamond Brale or an inaccurate test.

Round work is supported between two collars which permit rolling. Flat work is rested on top of the two collars and by means of an eccentric, a three-point support is provided. In either case the work being tested rests solidly and firmly upon the anvil.

— 187 —

Stroboscope, "Stroborama," Sequin

Musa-Hartzell-Du Casse, Inc., 25 W. 43rd St., New York City. [Vol.68,p.710]

The means of making an analysis of the motion of mechanisms which develop faults in operation through direct observation that retains true relationships between shape, size, reliefs, and depths, is available in the Sequin "Stroborama" stroboscope. The device per-

mits observations to be made from any position with respect to the mechanism being examined. Further, it is not limited in scope, since either a locomotive or a watch may be studied with equal facility.

The Neon lamp produces an illumination of 1,000 c.p., the intensity of illumination eliminating the effect of any other illumination present.

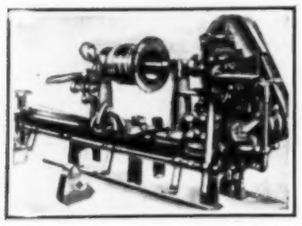
The synchronizer permits the emission of an intense light flash and one of such extremely short duration that parts of mechanism moving at a linear speed of 350 ft. per sec. appear with sharp and distinct contours and without any distortion of form or size. By regulating the speed of the synchronizer, it is possible to show the mechanism standing still, or with a continuous forward or backward motion.

— 188 —

Tension Indicator, Binding-Wire, Armature

General Electric Co., Schenectady, N. Y. [Vol.68,p.753]

This type of indicator is used in connection with the repairing of haulage-motor armatures, and indicates the exact tension in pounds that is applied to the steel binding wire by the binding machine or lathe. It is claimed that the binding wire will not be stressed beyond the elastic limit or tensile strength of the steel, and will be kept under uniform tension during the process of winding it in place.



A central-wheel pulley, over which the wire runs, is actuated by a heavy coil spring so that constant tension is maintained on the wire at all loads. The indicator on this device is graduated from 0 to 500 lb., allowing the use of any size wire suitable for this range.

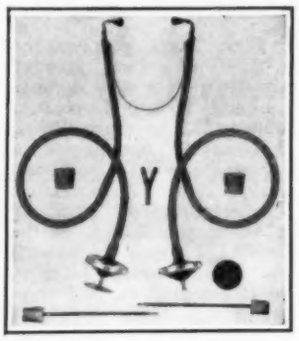
— 189 —

Sound Locater, "Transmit-O-Phone"

International Metal & Specialty Co., Berlin, N. J. [Vol.68, p.752]

This sound locater permits locating accurately the exact position of knocks in machinery. The instrument consists essentially of a headpiece, twin amplifiers, and connecting hose, together with a vibration disk and sound transmitting rods. Corks are used to clarify and cushion the sounds.

The two amplifiers permit two



different sounds in close proximity to each other to be distinguished. The disks are used for locating light sounds and the rods with the cork tips for sharp or loud sounds. The Y-piece is used where only one amplifier is necessary to locate the sound.

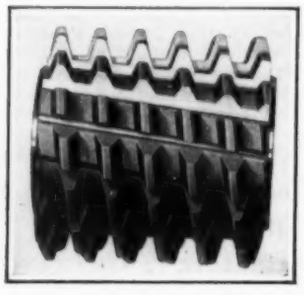
Small Tools

— 190 —

Hobs, "Shear Cut"

Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. [Vol. 68,p.897]

Roughing of spur gears may be performed quickly and easily by the use of "Shear Cut" hobs whose distinguishing characteristic is a shearing action. The construction of this hob provides an acute leading-cutting edge, a shearing top-cutting edge and an obtuse leaving-



cutting edge in each tooth in the hob. The gashes are undercut. Due to certain modifications of the lead and pressure angles of the hob teeth, the greater portion of the work is distributed on the acute- and shearing-cutting edges, and a comparatively small portion is left for the obtuse leaving-cutting edge.

The helical gashes in the hob have the same-hand helix as that of the thread. This is contrary to common practice in which the gashes are cut at right angles to the thread. It is claimed that this construction puts less wear on the cutting edges and permits a greater feed than is usual.

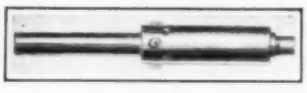
— 191 —

Boring Bars, Expansion

Larkin Packer Co., St. Louis, Mo. [Vol.68,p.438]

These simplified expansion boring bars are strictly production tools designed to maintain accuracy of bore and to compensate for wear on the cutters by means of micrometer adjustment. A wide range of cutter expansion and ease of adjustment are the principal features.

Four main parts compose the expansion unit, an adjusting screw graduated to 0.001 in., a wedge threaded on the adjust-



ing screw that serves to expand the cutters, a thrust collar for piloting the adjusting screw, and a removable bushing for retaining the expansion units in the body.

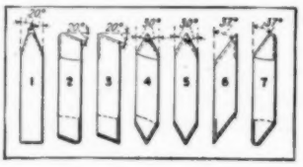
Cutters are made of high-speed steel uniformly heat-treated. All cutters are made to standard dimensions. When worn undersize beyond the range of expansion in one bar, they can be used in smaller bars of the same slot dimensions. Correct rake angles, relief, and special tempering are provided for boring various classes of material. Ten stock styles and sixteen stock sizes are available.

— 192 —

Tool Bits, Semi-Finished or Ground

H. F. Noyes Co., Bridgeport, Conn. [Vol.68,p.439]

Tool bits, either semi-finished or ground with standard clearances, are now being furnished by above company. Semi-finished bits in shapes 1, 3, 5, and



6, can be quickly finished into any desired shape for either lathes or planers. These bits are made from the best high-speed steel in sizes from ¼ to ½ in., and in lengths from 2½ to 4½ inches.

— 193 —

Cutter, Packing, "Novell"

Chickasaw Machine & Foundry Co., Memphis, Tenn. [Vol. 68,p.593]

The cutting and fitting of fibrous packing for piston rods, valve stems, and pump cylinders without waste of packing may be done with this device, which will handle sheets from ¼ to 1

in. thick, to fit any size rod, stem, or cylinder from ½ to 7 in. in diameter.

To set the machine, the stop is moved until the line, on the stop representing size of packing, coincides with the circular line on the dial representing the size of the rod. The beveled edge of the packing is held against the stop and the anvil, and the knife is moved forward with the lever. The result is a well-fitting ring.

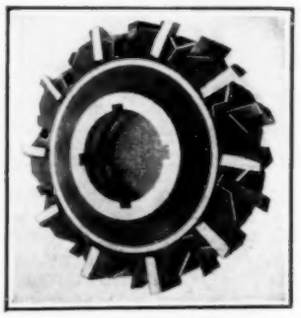
Weight 14 pounds.

— 194 —

Milling Cutters, Heavy-Duty, "O.K."

O. K. Tool Co., Inc., Shelton, Conn. [Vol.68,p.516]

These milling cutters are fitted with ¾-in. blades made from drop-forged high-speed steel. They are intended for very severe cutting. The blades are



tapered and have serrated backs which permit adjustment for wear.

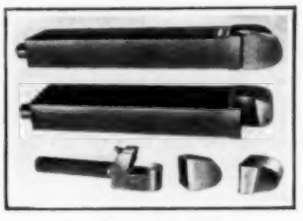
Any of the standard designs of cutters, such as slotting cutters, side mills and face mills are made. A suitable rake and spiral angle, as well as adequate chip clearance, is provided to suit the conditions obtaining.

— 195 —

Tool Bits and Holders, Shankless

O. K. Tool Co., Inc., Shelton, Conn. [Vol.68,p.790]

For turning locomotive tires and similar heavy work, these toolholders have been developed. They are without the customary round shank. The advantages claimed are that the holder is stronger because of the absence of the through hole necessary to hold the shank type of bit, that the bit is less expensive because containing less material and that, as the cutting edge recedes by continued grinding, the lost



clearance can be restored by setting in the lock bolt, thus crowding the bit sidewise in the direction of the cut.

A shallow, tapered dove-tailed groove in the holder receives a correspondingly dove-tailed tang on the bit. The tools are made in various sizes of both right- and left-hand type. The tapered tang is always wedged into the slot, no matter what

type of tool is under the pressure of the cut.

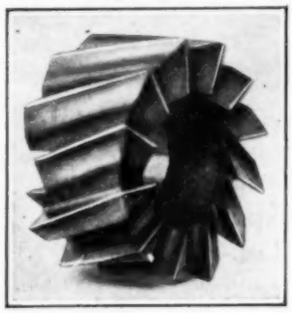
A small holder with a knurled handle has been developed to hold the bits while grinding. The bits are forged from high-speed steel, whereas the holders are made of nickel-chrome steel.

— 196 —

End Mills, Spiral Shell

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.68,p.949]

Both right-hand and left-hand spiral end mills are available in fourteen sizes, with diameters from 1¼ to 6 in., and for making



cuts from 1 to 2¼ in. in width. They can be furnished with arbors for use on Brown & Sharpe milling machines having threaded or taper-nose spindles, and on all milling machines having the standardized spindle end.

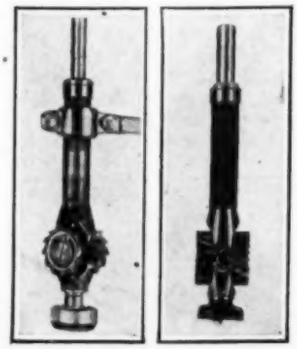
— 197 —

Boring and Milling Tool

Carl Schmidgall, Peoria, Ill. [Vol.68,p.946]

Milling, shaping, keyway cutting, grooving, and dovetailing are operations which may be performed with this tool which weighs less than a pound and has been used in boring in stone, wood, glass, iron, steel and copper.

The cutting is done by two large milling cutters, and two small ones that intermesh with the larger cutters. All four cutters are mounted on bevel gears which are driven from the internal shaft. The gears are not



exposed to dirt. The bottom cutter bores a round hole and the side cutters follow through and cut the shape of the hole desired. For hard materials, diamond cutters are used.

— 198 —

Spot Facer, Reverse

Scully-Jones & Co., 1901 S. Rockwell St., Chicago, Ill. [Vol.68,p.1023]

This reverse spot facer is useful for back spot-facing or counterboring inaccessible surfaces that cannot be readily faced from above. It consists of an arbor, cutter, horseshoe collar, and holding screws. The

cutter is driven by an integral square which mates with a corresponding square on the solid arbor. The arbor is made of alloy steel, hardened and ground.

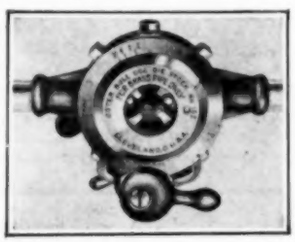
This device is furnished in four sizes of arbors, to carry cutters ranging as follows: ¾ to 1⅞ in.; 1¼ to 1½ in.; 1⅝ to 2 in.; and 2⅛ to 3 in., respectively.

— 199 —

Die Stock, Brass Pipe

Oster Manufacturing Co., Cleveland, Ohio. [Vol.68,p.715]

Automatic, quick-opening dies constitute the most important feature of the "Bull Dog" die stock for cutting threads on



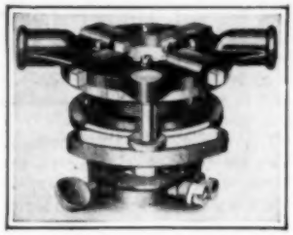
brass pipe. Such dies eliminate the necessity for backing-off the tool over the finished thread, a practice which is especially apt to ruin them when cut on brass pipe. The dies may be quickly adjusted to cut either deep or shallow threads.

— 200 —

Die Stocks, Beaver, Nos. 11 and 11A

Borden Co., Warren, Ohio. [Vol.68,p.905]

These adjustable die stocks, No. 11 plain and No. 11-A ratchet, have one set of dies to



thread 1-, 1¼-, 1½, or 2-in. pipe. The dies are quickly adjusted to thread any kind of pipe, including brass, under or over standard without affecting the length of the thread. The dies are made of high-grade alloy steel, hardened and tempered.

The work holder or pipe gripping device accurately centers the pipe. Two knurled screws are quickly set and hold it firmly to the pipe size, leaving only the thumb screw to be tightened after the die stock is placed on the pipe. Only a straight thread can be cut with the usual setting, but crooked or drip threads may be cut, if desired.

— 201 —

Chucks and Drills, "Stick-To"

Specialty Trading Corporation, 551 Fifth Ave., New York City. [Vol.68,p.516]

These chucks and double-twist drills are of Swedish manufacture. The chuck consists of four parts; the hollow arbor and outer sleeve, which, when screwed together, hold the drill

firmly with the aid of internal-taper surfaces; a jamb sleeve, and collar. The drill is held at two points without marring or dulling the cutting edge. The chuck is so small that it will work in very close quarters.

The double-twist drills are made of either carbon steel or high-speed steel, and are intended for use in the chucks. The full length of the drill can be consumed satisfactorily.

— 202 —

Drills, Cobalt-Steel

Morse Twist Drill & Machine Co., New Bedford, Mass. [Vol.68,p.634]

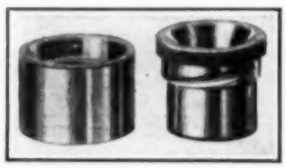
For drilling high-manganese steel, a cobalt-steel drill has been developed. In a laboratory test, it was possible with one grind to drill nine holes, 1½-in. deep, in a railroad frog having a content of 1.08 per cent carbon and 10.04 per cent manganese, and a Brinell hardness of 207 to 217. The company is prepared to make drills for this class of work upon specification.

— 203 —

Bushings, Drill "Arlok"

Universal Standard Co., 12121 Cardoni Ave., Detroit, Mich. [Vol.68,p.1026]

Two types of drill bushings for jigs are being offered by the above company. The standard "Arlok" bushings and liners as shown in the illustration are



recommended when a great many holes are to be drilled. Easy replacement can be effected by the operator. These bushings and liners are made in drill sizes up to 2 in., with outside diam. from ¼ to 3 in., and heights up to 2½ inches.

The press fit bushings, which are made in the heavy and tubular type, are made in the same drill sizes as the Arlok bushings.

— 204 —

Socket Wrench, Electric

Van Dorn Electric Tool Co., Cleveland, Ohio. [Vol.68,p.74]

Separate driving spindles for forward and backward rotation of socket wrenches to provide positive drive in either direction are features of this electric wrench. It is similar in prin-

ciple to a hand wrench for final setting or breaking loose of nuts with the addition of electric drive for spinning them on or off. A multiple-disk clutch operated by a lever in the handle engages the motor. When the clutch lever is released, the driving worm and gear automatically lock the spindle, thus

producing a hand wrench for final setting of the nut.

The unit is recommended for either hexagon or square nuts which do not exceed 1¼ in. across the flats. A complete set includes an electric wrench, one 3-in. socket adapter, one 11-in. socket adapter, and nine sockets ranging from 7/16 to 1 5/16 in. across the flats, either hexagon or square pattern.

Overall length 16 in.; overall width 10 in.; weight 14 pounds.

— 205 —

Wrench, "Klose Kwarter"

Billings & Spencer Co., Hartford, Conn. [Vol.68,p.276]

A wrench especially designed for use on hard-to-get-at nuts is being made under the trade name of "Klose Kwarter." It is a double-headed wrench with openings at a 75-deg. angle,

jaws narrow and pointed, and thin heads. Both heads are on the same side of the wrench, and afford a comfortable grip and good leverage.

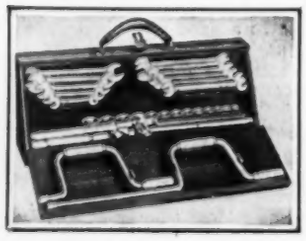
The wrench is made in all popular sizes to fit S.A.E. and U. S. Standard nuts. For automotive use they are packed five wrenches in a kit, giving an assortment of ten openings, varying in size from 7/16 to 7/8 in. The wrenches are all drop forged from chrome-molybdenum steel.

— 206 —

Wrench Sets, Combination, Williams-Husky

J. H. Williams & Co., Buffalo, N. Y. [Vol.68,p.751]

Through a merchandising agreement with the Husky Wrench Co., Milwaukee, Wis., two combination wrench sets have been placed on the market. The No. 642 outfit is known as the "Mechanic's Wrench Kit" suitable for garage use. It includes five Williams' "Superrenches" of either the engineer's or "Obstruction" pattern with ten different openings from 7/16 to 7/8 in., six tappet pattern "Superrenches" with openings from ½



to ¾ in., and thirteen "Husky" chrome-alloy steel sockets, sizes 7/16- to 1-in. hexagon, with seven wrench handles, either 3/8- or ½-in. hexagon or square sections as desired.

The No. 321 "Economy Wrench Set" is similar to the above except that the tappet wrenches have been omitted.

— 207 —

Dresser, Grinding Wheel, "Big Boss"

Ross Manufacturing Co., Cleveland, Ohio. [Vol.68,p.513]

This dresser is suitable for truing grinding wheels of 36 to 42 in. diameter which run at high peripheral speeds. It is equipped with thirteen 3 7/16-in. cutting discs which are mounted on a flatted sleeve, which in turn

rotates on a 1½ in. O.D. bearing. They are specially heat-treated and form an open pattern that does not fill up with wheel particles, nor dull the fresh crystals. The slotted holder-head permits quick removal of the cutting assembly for replacement of discs. The removal of 1/64 in. of loaded surface with a single pass is claimed.

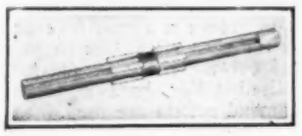
— 208 —

Mandrel, Expanding

W. G. Le Count, South Norwalk, Conn. [Vol.68,p.553]

At equidistant intervals around the circumference of the body of this expanding mandrel are cut four longitudinal splineways, the bottoms of which are inclined with respect to the axis of the mandrel, and in each splineway there is a sliding key tapered upon the bottom to correspond to the incline. The exposed edges of the keys are ground parallel. Midway of the length of each key is a rectangular-shaped notch deep enough to permit the introduction of a small collar. The collar prevents the keys from being displaced, yet permits them to slide freely.

Mandrels are furnished in sets



of four, accommodating holes from 1 to 2⅝ in. in diam. The amount of taper given to the bottom of the splineways is not the same for all tools, but is so calculated for each that the largest hole accommodated by one mandrel is of the same size as the smallest hole that will go over the next larger size of mandrel.

— 209 —

Hammer, Soft-Faced, Chanson

Illinois Iron & Bolt Co., Chanson Division, Carpentersville, Ill. [Vol.68,p.711]

This soft-faced hammer is manufactured in five sizes and seven styles, the weights varying from ¾ to 8 lb. and the lengths

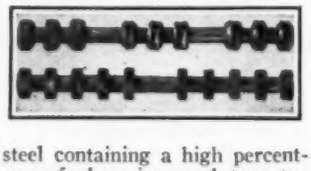
from 10 to 24 in. The plugs are machined to a press fit in the steel body of the hammer head and may be furnished in either copper, steel, or babbitt.

— 210 —

Knurls, Standard, Stock

Hardware Products Co., Boston, Mass. [Vol.68,p.714]

Immediate delivery of standardized sizes and patterns of knurls can be made from a comprehensize list. These knurls are made from a special alloy



steel containing a high percentage of chromium and tungsten and are heat-treated to develop great hardness without brittleness. The teeth are formed by means of hobs so that they are sharp and uniform.

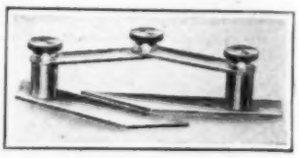
— 211 —

Bevel, Combination, No. 502

Brown & Sharpe Manufacturing Co., Providence, Rhode Island. [Vol.68,p.948]

This No. 502 improved combination bevel is suitable for use by tool makers, and draftsmen. One feature of the design is the two posts which make possible an unobstructed view of any angle at which the blades may be set, and also gives clearance for scribing or drawing lines the full length of the blades.

The design also permits the



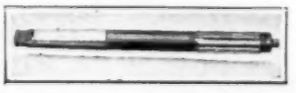
use of the blades on alternate sides of a projection, up to 7/8 in. in height. The blades are of steel and are ground accurately to angles of 30, 45, 60, and 90 deg. The posts are made of a light metal to decrease the weight.

— 212 —

Reamers, Chucking, Expansion, "Lok-Tite"

Butterfield & Co., Division of Union Twist Drill Co., Derby Line, Vt. [Vol.68,p.989]

Wear at the point is compensated for in these "Lok-Tite" expansion chucking reamers which have the end slit up the cutting end between the flutes.



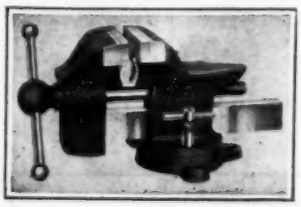
One end of a stud is screwed into the body of the tool. The other end is conical in shape and expands the slit portion of the reamer when advanced by a nut. The worn points of the reamer flutes are brought out to the desired diameter, and the reamer is reground to size.

— 213 —

Vise, Universal

Athol Machine and Foundry Co., Athol, Mass. [Vol.68,p.949]

This small bench vise has 3½-in. jaws. The principal castings are of semi-steel, and the inserted jaw-faces of hardened tool steel. Tool steel is also used for the beam and a buttress thread is cut upon the screw. The swivel base permits the vise to be locked firmly in any one of several positions by



means of a tapered dowel pin.

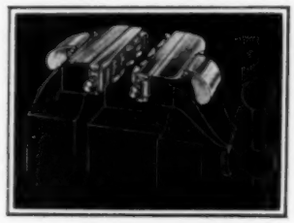
Pipe grips are secured by blind screws to the main casting and movable jaw. They are so designed that they do not interfere with the work and they, as well as the checked jaw faces, may be replaced when desired. The anvil adds to the usefulness of the vise as a general-purpose tool.

— 214 —

Vise Grips, "Universal"

United Hardware and Tool Corporation, 74 Reade St., New York City. [Vol.68,p.355]

Odd-shaped pieces can be held in a vise having this "Universal" vise-grip which consists of a



pair of detachable compensating jaws that are placed in the regular vise jaws. It is claimed that there is no danger of marring or jamming the lightest or heaviest piece held. The vise-grips are made of hardened and polished steel, and will stand any pressure the vise will stand. They are fully guaranteed, and are made in two sizes, No. 4 and No. 5, to take care of vises ranging from 3 to 6 inches.

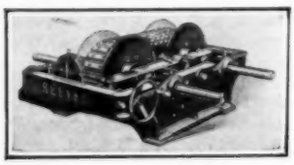
Transmission Equipment

— 215 —

Transmission, Variable-Speed, Improved

Reeves Pulley Co., Columbus, Ind. [Vol.68,p.199]

Several major improvements in this variable-speed transmission make it stronger, more compact and more powerful. The chief improvement is a double-block, center-pull V-belt. This belt gives over twice the surface contact against the



driving disks as the previous design, as well as maximum strength, quietness, and operating ease, with more efficient transmission of power. This belt can be run at low tension with high efficiency, thus lengthening the life of the belt and reducing the load on the driving parts of the mechanism.

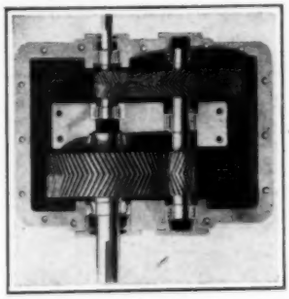
A new method of disk lubrication has been developed, which is said to give the highest degree of efficiency to the force-feed system which the transmission regularly employs.

— 216 —

Speed Reducers, Herringbone, Continuous-Tooth

D. O. James Manufacturing Co., Chicago, Ill. [Vol.68,p.949]

These speed reducers have generated teeth, and are built in both single and double types. The single-type reducer is equipped with Timken tapered roller bearings on both high- and low-speed shafts. The double-type reducer, however, is



equipped with Hyatt roller bearings on the high-, intermediate-, and low-speed pinion shaft, and with Timken tapered roller bearings on the slow-speed gear shaft.

— 217 —

Speed Reducers, Vertical, Type V

Boston Gear Works Sales Co., Norfolk Downs (Quincy), Mass. [Vol.68,p.1067]

Slow speeds of vertical shafts can be obtained by the use of this Type V vertical speed reducer which is designed so that the driven shaft can project

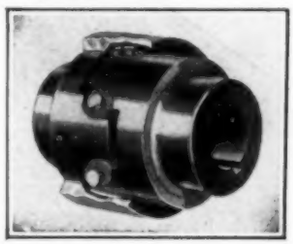
above or below the device, or both, since a special oil-tight construction prevents any oil leakage. Timken tapered roller bearings are used throughout. Phosphor-bronze worm gears and hardened steel worms, having their threads ground and polished, are employed.

— 218 —

Flexible Couplings, L-R

Lovejoy Tool Works, 319 W. Ohio St., Chicago, Ill. [Vol.68, p.193]

Angular misalignment up to 7½ deg. in each direction, parallel misalignment of $\frac{1}{16}$ to $\frac{1}{8}$ in., and endwise shaft movement of $\frac{1}{4}$ to $\frac{3}{4}$ in. are possible without loss of efficiency in this cou-



pling. It is of the jaw type, with loosely-floating resilient rollers, floating radially, assuring a rolling contact which transmits the force by compression, and makes a safe and shock-proof coupling.

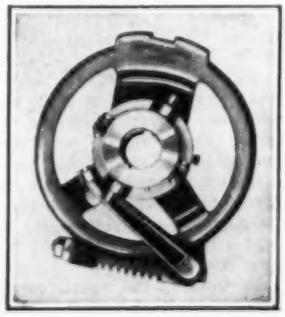
Either solid-rubber or rubber-covered metal rollers are used as conditions require, and an external sleeve prevents them from flying out. Because of the construction used, no end thrust or radial load can be transmitted. The coupling is available in eleven sizes to take shafts ranging from $\frac{3}{4}$ to 5 in. in maximum diameter.

— 219 —

Clutch, Compression

Conway Clutch Co., 1956 W. Sixth St., Cincinnati, Ohio. [Vol.68,p.516]

This large compression clutch is for use where a speed of not more than 300 r.p.m. is required. It is made in four sizes having a fixed capacity for transmitting up to 75 hp. at 100 r.p.m. The diameters of the friction sur-



faces are from 12 to 20 inches.

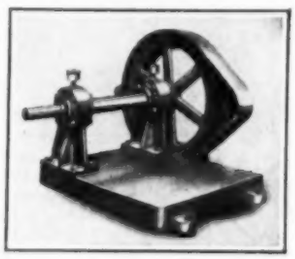
The device is of compact construction both as regarding the swing diameter and the lengthwise shaft space required for a given horsepower. It is usually operated by the familiar form of shifter yoke. The friction lining may be easily replaced. The company claims as salient features; easy engagement, instant release, dragfree idling, and high-power capability.

— 220 —

Gear Reduction, Motor Base, Type C-R

Bridgeport Motor Co., Inc., Bridgeport, Conn. [Vol.68,p. 516]

This entire line of speed-reduction geared motor bases can be furnished equipped with Hyatt roller bearings. Any of these bases may be mounted in



an inverted position, or at any angle without special attention to the bearings, so long as the shaft remains horizontal.

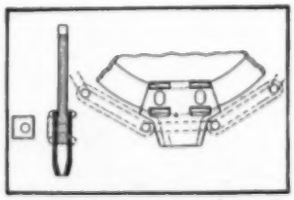
Basis intended for locations demanding a drive other than horizontal are provided with Timken bearings. The sizes range from ¼ to 12 hp. and the reductions available are 3, 4, 5, 6, and 7 to 1. Right-hand drive is standard for these units.

— 221 —

Sprocket, Expansible-Tooth

Union Chain & Manufacturing Co., Sandusky, Ohio. [Vol. 68,p.634]

The teeth of this device may be adjusted from time to time to accommodate the natural wear and consequent elongation of the links of the chain. This pro-



vision permits maximum efficiency, longer life, smoother and quieter running, and permanent sprocket installation. After the chain has been elongated beyond a proper fit on the sprocket, the

nuts are released and the eccentric blocks readjusted so as to expand the teeth to the next larger pitch diameter. The teeth are made from alloy steel to insure long service.

— 222 —

Hangers, Self-Aligning

Boston Gear Works Sales Co., Norfolk Downs (Quincy), Mass. [Vol.68,p.1027]

This type BF hanger, which is fully self-aligning and equipped with ball bearings, can be readily fastened to a shaft at any point. The design permits

height adjustment, and is constructed so that it remains rigid after proper adjustment.

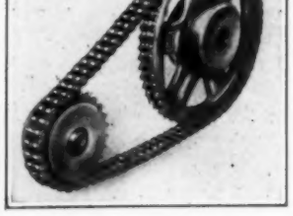
These hangers are suitable for use as outboard bearings in connection with the operation of speed reducers and chain drives. The shaft bores are made in fractional dimensions, and they are stocked for immediate delivery.

— 223 —

Chain Drives, Standardized, Renold-Boston

Boston Gear Works Sales Co., Norfolk Downs (Quincy), Mass. [Vol.68,p.1064]

A series of standardized chain drives capable of delivering from 1 to 100 hp., in both roller and solid type, have been per-



fected by the Boston Gear Works, Inc. By consulting the company's new book "Renold-Boston Chain Drives," the correct standardized chain drive for any particular application can be selected readily by the use of simplified selection charts.

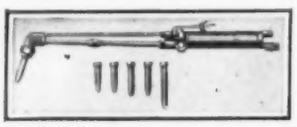
Welding Equipment

— 224 —

Torch, Cutting and Welding, Combination, Light-Weight, Type RI

Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md. [Vol.68,p.75]

This type RI combination torch is similar to the type NI combination cutting and welding torch, but is lighter in weight. By interchanging the tips, the operator can either cut or weld



with the torch, which is made to operate with oxygen and acetylene, hydrogen, or other gases. It will weld the lightest or heaviest metals and cut metals up to 12 in. in thickness. Its weight is 2¼ pounds.

The torch has two gas tubes made of stainless steel. The thumb button for the high-pressure cutting oxygen remains fixed in either the open or closed position. The torch head is made of forged bronze. All the valves are readily accessible. Among other features are good balance, ease of operation, and thorough mixing of the gases so that a neutral, uniform flame results.

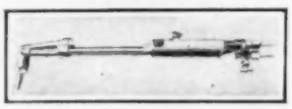
— 225 —

Blowpipe, Cutting, Type C-14

Oxweld Acetylene Co., 30 E. 42nd St., New York City. [Vol.68,p.276]

The cutting blowpipe, known as type C-14, uses the same nozzles as the Oxweld type C-2, which it resembles, although several improvements in design have been made. The three gas tubes are straight, having no bends either outside or inside the handle. The cutting valve is of the same design as has been used on type C-6 for many years, and is now used on all hand cutting blowpipes of the same make.

As before, the small needle



valve bodies used for acetylene on the cutting blowpipes are forgings, and in addition both the head and the rear body of the type C-14 blowpipe are forgings instead of castings.

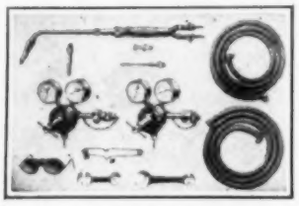
Interchangeable nozzles are provided so that the blowpipe may be used with either medium- or low-pressure acetylene.

— 226 —

Welding Outfits, "Presto-O-Weld"

Oxweld Acetylene Co., 30 E. 42nd St., New York City. [Vol.68,p.437]

These three welding outfits are intended for automobile repair shops, or sheet metal shops. The Type W-101-A auto repair outfit is for the garage that has



only an occasional welding job but needs a large-size blowpipe for frame straightening. A special heating tip, and a radiator battery tip, which consumes acetylene only, are designed for light heating, brazing, and soldering operations.

The type W-102-A general-purpose outfit is for welding, decarbonizing, heating, soldering, brazing, lead burning, and radiator repair. Five welding tips and a decarbonizing blowpipe, as well as the heating and radiator soldering tips, are included.

The type W-102-B welding outfit is recommended for auto body and fender work, and for welding light and medium castings. It is also suitable for the sheet metal shop. This outfit includes five welding tips.

— 227 —

Blow Torch, Portable, "Clements-Cadillac"

Clements Manufacturing Co., 609 Fulton St., Chicago, Ill. [Vol.68,p.791]

Uniform heating temperatures from 1,600 to 2,300 deg. F. can be obtained by the use of the blow torch illustrated. The unit consists of a motor-driven torch, mounted on a stand, and is equipped with an 8-ft. gas hose and a 20-ft. reinforced cable with armored, separable plug. The motor is of the high-speed, air-cooled type, mounted on ball bearings, and can be supplied in

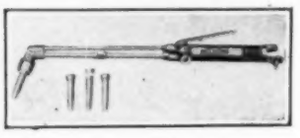
voltages ranging from 100 to 275. It is claimed that the operating cost is low, made possible largely on account of the maximum air volumes used at uniform velocity.

— 228 —

Torch, Combination Cutting and Welding

Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md. [Vol.68,p.909]

A convertible tip permits this type TI torch to be used for both cutting and welding operations. By a quarter turn of



the tip, either a cutting or welding flame can be produced.

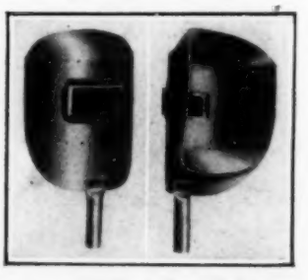
The torch heads, valves, bases, and other parts are made of bronze forgings. The seamless, high-pressure tube has triple thick walls, and is made of nickeled silver. The tips have been designed to be still serviceable for welding after becoming less suitable for cutting.

— 229 —

Handshield, Model "O," and Helmet, Model "OO," "Cesco"

Chicago Eye Shield Co., 2300 Warren Ave., Chicago, Ill. [Vol.68,p.200]

Extreme lightness of weight, proper ventilation, and the exclusion of all outside light is



featured in the model "O" hand-shield. There is a flange on the inside that fits up under the chin, so as to assure the shield's being held in the prescribed position at all times. The shield is made throughout of special vulcanized fiber of high strength and wearing qualities.

The Model "OO" helmet is designed to be strapped to the head. The inside construction is such as to allow the shield to be raised or lowered without any friction on the side of the operator's head. The helmet will remain in either the active or inactive position.

The helmets employ "Essentialite" lenses which cut out the ultra-violet and infra-red rays, but let the visible rays pass through to permit the workman to see his work.

— 230 —

Welding Electrodes

Fusion Welding Corporation, 103rd St. and Torrence Ave., Chicago, Ill. [Vol.68,p.398]

These two mild steel welding electrodes are known as "Blue Streak" and "Yellow Jacket." The "Blue Streak" is a fast-flowing electrode, melting more rapidly than fast-flowing bare wire, and has more arc stability than flux-coated rods. It is especially suited to the welding of medium- and light-gage plates and sheets. It is a full flux-coated electrode.

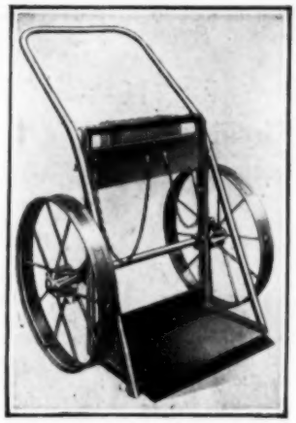
The "Yellow Jacket" electrode is surfaced, and is designed to give great penetration when used with high current on heavy material. Half-inch mild steel plates have been welded at a rate of more than 20 ft. per hr., without beveling the edges.

— 231 —

Oxy-Acetylene Truck with 24-Inch Wheels

Oxweld Acetylene Co., 30 E. 42nd St., New York City. [Vol.68,p.237]

This two-wheel truck for oxy-acetylene equipment features 24-in. wheels in order to make the truck easier to handle. The hubs are bored to fit the cold-rolled steel axles and are



grease lubricated for high-speed hauling behind a motor truck.

The handle is continuous and the upper portion is bent back so that the truck can be handled easily by an operator of small stature. The tool box is larger and is provided with a cover and a holder for extra blowpipe tips.

It is possible to substitute 14-in. wheels by changing the position of the axle.

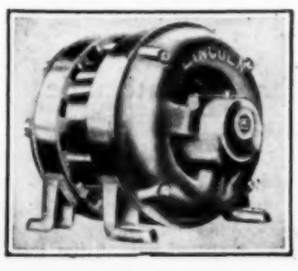
Electrical Equipment

— 232 —

Motor, "Switch Start"

Lincoln Electric Co., Cleveland, Ohio. [Vol.68,p.36]

The "Switch Start" motor is built in sizes from ½ to 30 hp., for either 2- or 3-phase, 60-cycle applications. It can be started directly across the line without the use of a starting compensator, starting resistance, or other voltage-reducing mechanism, but maintains a low starting current.



The operating characteristics have not been sacrificed in order to secure low starting current. It is also claimed that the efficiency is equal to, or better than, the ordinary self-starting motor, and that the power factor is from 5 to 10 points higher. Tests indicate that the starting torque ranges from 100 to 250 per cent of full load, depending upon the horsepower and speed. On sudden high overloads, the "Switch Start" motor has a high pull-out torque.

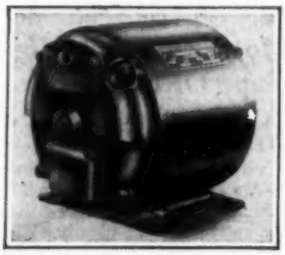
The temperature rise of these motors under continuous full load is low due to the electrical design and also to the welded steel construction which permits free circulation of air. This line of motors is normally equipped with sleeve bearings, but ball bearings can be had.

— 233 —

Motor, Split-Phase, Type 58 RB

Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo. [Vol.68,p.318]

One of the outstanding features of the Wagner 58 RB split-phase motor is an improved switch capable of 500,000 starts



and stops. Some of the claims made for the switch are: breaks contact instantaneously without dragging; multiplies the contact surface; never lengthens its starting time beyond that proper for the motor; gives wiping contact without undue wear; will not warp, loosen or weaken; will not rust, bind or stick; and consists of only a few simple parts.

In addition to this improved switch, the Wagner type 58 RB motor employs an improved method of oiling, a heavy formed steel base, drip-proof end plates, a spacious terminal easy to get at, and is well insulated to prevent grounding.

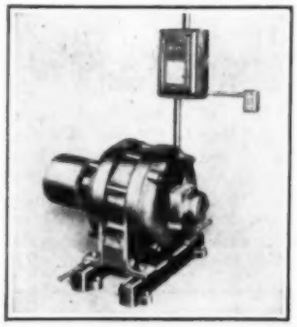
The motor is available in ½-, ¾-, and 1-hp. sizes.

— 234 —

Motors, Induction, Line-Start

Allis-Chalmers Manufacturing Co., Milwaukee, Wis. [Vol.68, p.395]

These motors are normal-torque, high-reactance machines, and will not draw starting cur-



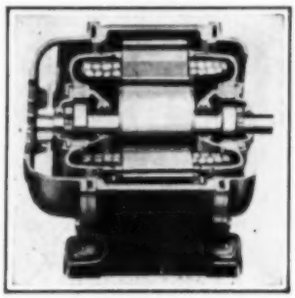
rent in excess of N.E.L.A. limits. They are built in ratings from 7½ to 30 hp., 600 to 3,600 r.p.m., low voltage, and are available for either sleeve or roller bearings. The usual Allis-Chalmers constructional features are retained in this line. A magnetic switch with push-button control is the only starting equipment required.

— 235 —

Motor, Totally Inclosed

American Electric Motor Co., Cedarburg, Wis. [Vol.68,p. 397]

This is a totally inclosed ventilated motor with a 40-deg. rating. Under severe tests it has been found that dust and grit cannot get into the windings as they are hermetically sealed in hoods. Air in the inclosed por-



tion is agitated by malleable cast fans shrunk on the motor shaft.

Ball bearings contained in dust-proof housings support the rotor shaft. The inclosed hood of the motor can be removed without disturbing the bearings.

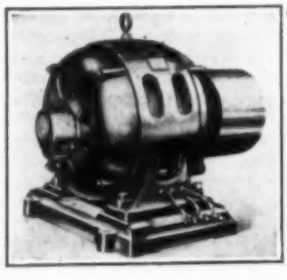
The stator is removable and can be replaced readily in case of damage. The stator windings are treated with a special oil- and acid-proof varnish, carefully dried so as to retain its flexibility. The rotor is of the usual construction. The end rings are electrically welded to the bars and form a one-piece squirrel cage of uniform material.

— 236 —

Motors, "Across-the-Line-Start"

Triumph Electric Corporation, Cincinnati, Ohio. [Vol.68, p.715]

These motors are available in sizes ranging from 1 to 30 hp., and are suitable for automatic push-button control installations. They are claimed to develop at least 170 per cent full-load



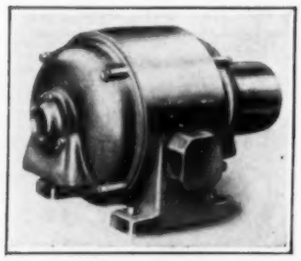
torque at starting without drawing current in excess of N.E.L.A. ratings. Timken roller bearings are standard equipment.

— 237 —

Motors, Totally Inclosed, "Cros-Line"

Sterling Electric Motors, Inc., Los Angeles, Calif. [Vol.68, p.672]

Total inclosure is the main feature of the "Cros-Line" motors, designed for across-the-line starting by means of push-button control. They are built



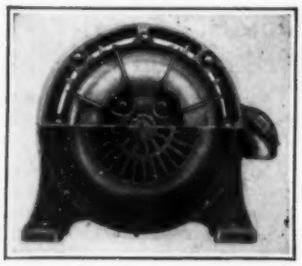
for both 220- and 440-volt circuits, and are mounted on either ball or tapered roller bearings, in sizes of ½ to 30 hp., for three-phase applications. Single-phase machines are built in sizes from 1 to 5 hp. for operation at various speeds. These machines may be mounted in any position.

— 238 —

Motors, Air-Jacketed

Wagner Electric Corporation, St. Louis, Mo. [Vol.68,p.670]

These air-jacketed motors were designed for serving where dust, fumes, and moisture are present. The entire motor is surrounded by a jacket open at both ends, and has a one-piece fan mounted on a shaft exten-



sion within the jacket. The end shield has a substantial grating for ventilating air. The center shield is made of heavy sheet steel.

The only clearance between the rotating and stationary parts of the motor is in the bearing housing, and it is so small that foreign matter cannot get past the grease packing. The exposed outer rim of the stator is deeply grooved to increase radiation surface and the stator laminations have been welded together to lessen vibration and reduce magnetic noises.

The motors are equipped with ball bearings sealed in dust-proof housings. Single-phase, repulsion-induction motors may be had in sizes from 1 to 20 hp., and polyphase squirrel-cage motors in sizes from 2 to 30 hp. These motors are designed for a temperature rise not in excess of 50 degrees.

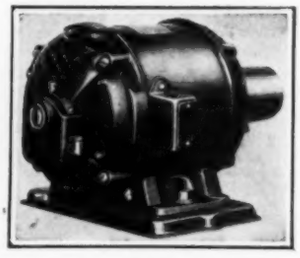
— 239 —

Motors, D. C., Type DM

Century Electric Co., St Louis, Mo. [Vol.68,p.866]

Vibration in the type DM d.c. 40-deg. motors is minimized by balancing the armatures both statically and dynamically. They are built in sizes of ⅛ to ¼ hp., to operate at standard speeds.

The special feature includes a field consisting of a two-pole



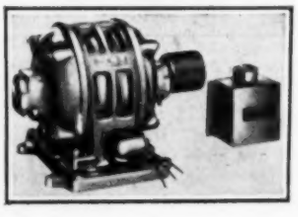
laminated steel structure with compound-wound field coils. The brushes are carried in a box-type holder attached to the field frame, and require no adjustment during their life. Bearings are of cast phosphor-bronze, having machine-cut oil grooves to insure even distribution of oil. The Century wool-yarn system of lubrication permits continuous operation for one year without reoiling.

— 240 —

Motor, Condenser, Squirrel-Cage, Single-Phase, Type L-A

Louis Allis Co., Milwaukee, Wis. [Vol.68,p.1025]

High efficiency and power factor, due to the use of a condenser, are characteristic of the type L-A single-phase, squirrel-cage motors. The efficiencies range between 70 and 90 per cent, and the power factor between 85 and 100 per cent. The



motors are built in capacities of from ½ to 5 hp., operate on 110 or 220 volts, and can be obtained for frequencies of 25, 30, 40, 50, and 60 cycles.

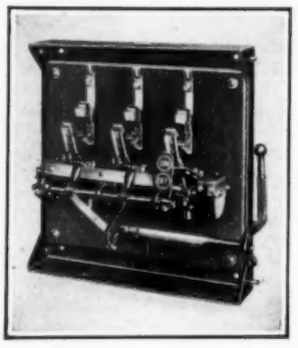
This motor is recommended for applications requiring low starting torque. For such service, the motor starts smoothly, and operates very quietly. A speed variation down to 40 per cent below normal speed can be obtained. They can be used for either constant- or variable-speed application and are built in standard speeds from 450 to 3,600 r.p.m. The condenser is completely sealed in the sheet metal box, and the leads are brought out to a conduit connection.

— 241 —

Circuit Breaker, Inclosed

Roller-Smith Co., 233 Broadway, New York City. [Vol.68, p.317]

Three types of inclosed circuit breakers are available. The type ESF, standard type, free-handle circuit breaker is shown, and is recommended for all applications where an inclosed cir-



cuit breaker of the non-closable-on-overload style is required.

The breaker proper is "standard" type, but a few modifications have been made to adapt it to inclosed service. The boxes are made of heavy-gage sheet metal, built to withstand the large pressures generated when a breaker opens under a heavy overload or short circuit.

The type ESF circuit breaker is made in the single-, double-, triple-, and four-pole type from 5 to 800 amp. The type ES standard circuit breaker differs from the type ESF in that it is not of the free-handle type. The handle projects directly through a slot in the front of the cover. The type ES breaker is also made with one to four poles, and 500 to 800 amperes.

The type EI inclosed industrial circuit breaker is made in capacities of from 3 to 100 amp. These breakers cannot be supplied with free handles, nor with time limits. They are similar to the type ES except that the breaker itself is of the industrial type.

— 242 —

Circuit Breaker, Automatic, for U. S. Grinders

United States Electrical Tool Co., Cincinnati, Ohio. [Vol.68, p.440]

This approved type of starting switch was developed for the 7-in. electric grinder made by this company. When the lever is thrown to the "on" posi-

tion, a small dog holds the current on until overloaded or tripped by hand. The automatic overload device is carefully calibrated.

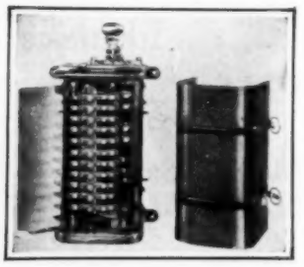
This device is quite simple. There are no springs or complicated mechanism to get out of order. It is durable, and well insulated. The casing and operating lever are made of molded Bakelite.

— 243 —

Switch, Drum

General Electric Co., Schenectady, N. Y. [Vol.68,p.354]

This type CR-3202-1308-A drum switch is a primary and secondary reversing switch for



slip-ring motors. It has five points forward and five points reverse, is suitable for starting duty or speed-regulating duty, and can be used with 220-, 440-, and 550-volt motors rated at 15 hp. and less.

— 244 —

Starter, Automatic Induction

Lincoln Electric Co., Cleveland, Ohio. [Vol.68,p.398]

This automatic induction starter has two adjustable features: The first is in the start-

ing current and starting torque, and is made by changing the position of the rotor in the regulator. The second is in the current at which the throw-over takes place. The throw-over is controlled by a retarding solenoid which is operated by the motor current.

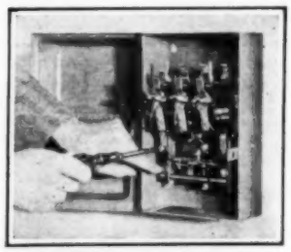
At starting, the correct voltage is applied to the motor and the starting current is held within the desired limits. The motor is controlled by the conventional start and stop buttons. At running speed and normal current, the switch automatically sets itself in the running position, without interrupting the torque of the motor.

— 245 —

Starter, Induction-Motor

Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa. [Vol.58,p.552]

The addition of this 1½-hp. starter provides a complete line of full-voltage starting devices ranging from 1 to 75 hp. It is particularly suited for the start-



ing and protection of small induction motors driving machine tools, textile machinery, pumps, fans, and many other machines where remote control with complete protection to operator, motor, and machine is desired. It also can be used as a magnetic primary switch for wound-rotor motors within its capacity. It comes equipped with either hand, or automatic reset on thermal overload relay.

The approximate dimensions of the dust-proof inclosing cabinet are 8½x12½x5¾ inches.

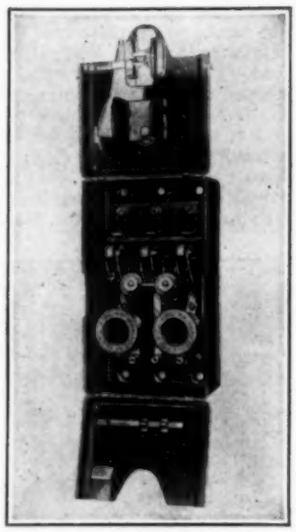
— 246 —

Starter, Manual, A.C.

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol. 68,p.671]

This manual across-the-line a.c. motor starter, designated as CH-9115, has thermal-overload cutouts which provide complete motor protection. Other features are the cadmium-plated, double-break roller contacts and small dust-proof inclosing case.

The roller contacts by breaking the arc in two places prolonging their usefulness several times the usual life, and in addition turn after each operation



so that a new surface is presented for contact.

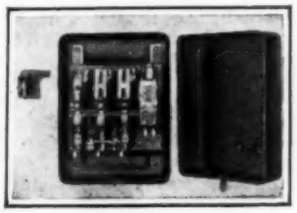
The dustproof inclosing case is made with a cover in two sections, so that the lower section only need be removed to replace the thermal-overload cutouts. All parts are quickly accessible for inspection. It is suitable for use with fans, pumps, textile machinery, and small machine tools.

— 247 —

Switch, "Across-the-Line"

General Electric Co., Schenectady, N. Y. [Vol.68,p.711]

Squirrel-cage motors may be thrown directly across the line when this magnetic switch, designated as CR-7006-D-31, is employed. The switch may also be used as a primary switch for a wound-rotor motor, the sec-



ondary of which is handled by a drum controller. The device consists of a magnetically-operated contactor of the triple-pole, restricted-blowout type with normal, open interlocking and two hand-reset temperature-overload relays, all mounted on a molded base inclosed in a steel case.

It was designed for use on standard voltages and frequencies, and the ratings for two- or three-phase, 3-wire installations vary from 50 to 125 hp. The switch is operated ordinarily by means of a push-button station.

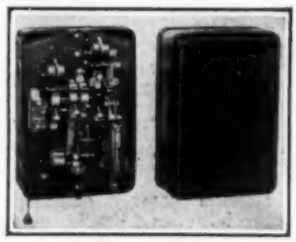
— 248 —

Starters, Motor, D.C.

General Electric Co., Schenectady, N. Y. [Vol.68,p.792]

These five starters are designed to provide definite time acceleration for constant- and adjustable-speed motors. One of the principal advantages incorporated in this line is the fact that despite a reduction in size the number of accelerating points has been increased.

The CR-4065 starter is a constant-speed type for general purpose applications and the CR-4066 is the same type with



the addition of dynamic braking. The CR-4166 is an adjustable-speed type with dynamic braking and full-field features. The CR-4068 is a constant-speed type reversing with dynamic braking, and the CR-4168 is an adjustable-speed type reversing with dynamic braking and full field features.

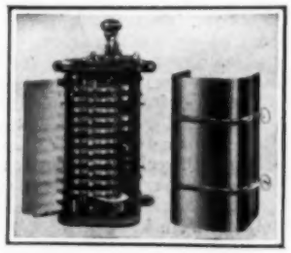
On those starters provided with dynamic braking a small relay is used to prevent the solenoid from being re-energized until the motor has come to rest. Thermal overload protection is provided.

— 249 —

Switches, Drum, Primary-Resistance

General Electric Co., Schenectady, N. Y. [Vol.68,p.827]

This primary-resistance drum switch is of the primary reversing type and is intended for use with squirrel-cage induction motors on small cranes, hoists, and



machine tools. The capacity is rated in horsepower. It is designed for wall mounting and can be furnished with a standard conduit box.

Two forms of the switch are available, CR-3200-1250-B, suitable for hoists where the motor is overhauled in the lowering direction, and CR-3200-1250-B which is suitable for hoists where the motor is not overhauled in lowering.

The switches are designed for operation on maximum primary voltages of 550 and have a rating of 15 hp. for two- or three-phase motors.

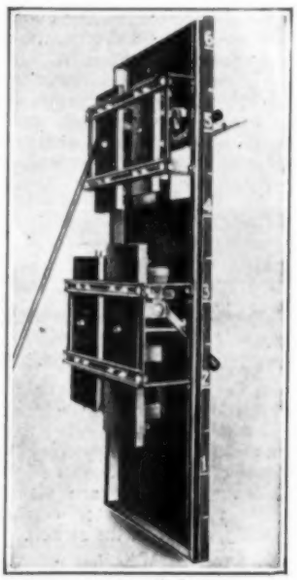
— 250 —

Switches, Back-of-Board

Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa. [Vol.68,p.866]

Safety in switching operations of the low-voltage class is met by this line of type BB back-of-board knife switches. They are mounted on steel panels of the dead-front type and are particularly adapted for industrial control.

Each switch and its operating mechanism is mounted on a slate base behind the steel panel



with only the operating handle passing through the panel. Complete accessibility of the switch and fuses from the front of the switchboard is provided by means of a fuse door interlocked with the switch handle so that the switch must be in the full open position before the fuse door can be opened.

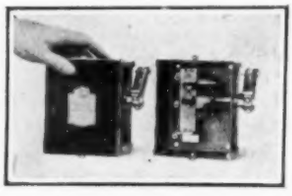
These switches are made for 250 volts d.c. and 500 volts a.c. and for capacities ranging from 30 to 800 amp. They can be obtained in one-, two-, three-, or four-pole units, fused or unfused, and with or without quick-break attachments.

— 251 —

Master Switch, Shipper-Rod-Operated

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol. 68,p.946]

This switch, which is used as a pilot circuit control device on lathes and other equipment where starting and stopping of the machine is to be governed by a splined shaft or shipper rod, is designed especially for three-wire control, but can also be used for two-wire control on pilot circuits up to 550 volts. It



may be mounted at the end of the machine, the splined shaft or shipper rod running the full length.

The main bearing consists of a steel shaft running in a long brass bushing to reduce wear. The operating lever is clamped to a square steel shaft so that it can be shifted to any one of four positions, 90 deg. apart, to suit mounting conditions.

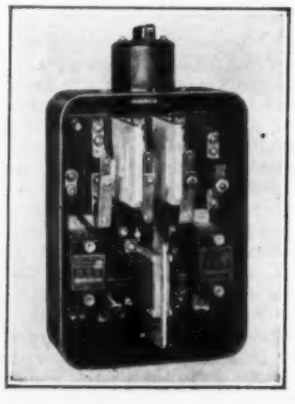
The mechanism is protected against damage by a shear pin. A heavy pressed steel, dust-proof inclosing case, arranged for conduit wiring, protects the switch.

— 252 —

Control Switches

General Electric Co., Schenectady, N. Y. [Vol.68,p.1071]

For application where it is desirable to control a magnetic starter at the switch itself, these two small control switches have been designed. They may be mounted in the knockouts of the inclosing case and are rigidly held in place by a conduit bushing, a part of the switch.



One control switch, SY-103-A, is of the maintaining-contact type with its action similar to a single-pole, double-throw switch. It is provided with three positions, "Hand," "Off," and "Automatic." This switch can be applied to machines controlled by thermostats, and also where float switches and pressure governors are used in the same manner as a thermostat.

The second device, SY-194-A, is a two-position, momentary-contact switch, and equivalent to the usual push-button station. It is applicable to situations necessitating the starting and stopping of the motor at the magnetic switch.

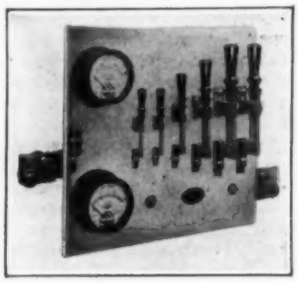
Both switches are equipped with leads ready for wiring and have sufficiently capacity to handle magnetic starters up to 75-amp. capacity. They can be used on 600-volt circuits.

— 253 —

Rheostats, Plating-Tank, Type REI, "Optimus"

Hanson-Van Winkle-Munning Co., Matawan, N. J. [Vol.68, p.909]

Definite control of plating baths is assured by the use of this "Optimus" Type REI plating-tank rheostat. The apparatus is suitable for use with plating solutions whether of



chromium, nickel, brass, copper, cadmium, zinc, tin, gold or silver.

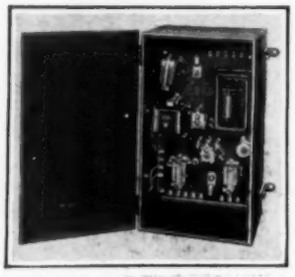
Resistances and control devices are mounted upon an asbestos panel board. Resistance coils are mounted on studs at the rear of the board while standard knife switches provide a maximum number of resistance variations with a minimum number of settings. A voltmeter and ammeter are included. The line voltage and also the drop at the tank can be read. The current density can be regulated by means of varying resistances controlled by the knife switches, therefore, a constant voltage drop from the tank can be maintained, regardless of the cathode surface. As the voltage at the tank regulates the current density, the average thickness of deposit in a given time is definitely controlled.

— 254 —

Control Panel for Automatic Welding Head

General Electric Co., Schenectady, N. Y. [Vol.68,p.1025]

This control panel is used in connection with automatic welding heads to regulate the feed of electrode wire. With it, the feed of the electrode wire is stopped a short time before the shutting off of the welding current at the end of the weld. As a result, it clears the electrode from the weld so that easy removal of the piece can be effected, and it fills in the crater



which is left at the end of the weld when the arc is cut off short.

Functioning of the panel is controlled by a start and stop push-button station. Mounted on the panel are a line contactor, an arc-voltage regulating relay, relays for controlling the travel motor and for clearing the electrode from the weld. There are also rheostats for controlling the arc voltage and the speed of the electrode motor. A small meter panel is used for indicating the arc voltage and welding current.

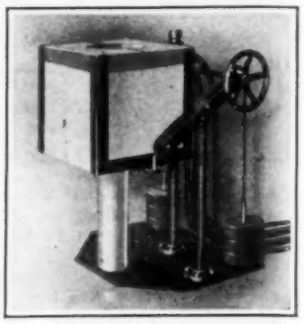
— 255 —

Furnace, High-Frequency, Drop Coil

Ajax Electrothermic Corporation, Ajax Park, Trenton, N. J. [Vol.68,p.396]

The furnace developed has the following characteristics: the heat is generated uniformly throughout the mass to be melted; thorough mixing of alloys takes place without the use of stirring rod or any motion of the furnace; a crucible of standard shape, easily removable, is used; and high efficiency. The energy is supplied by electromagnetic induction from a coil surrounding the crucible. The heat is generated by induction within the metal and crucible wall. The coil itself consumes little power and is water cooled.

Besides metal, non-conducting materials can be heated in this furnace in a conducting crucible. For example, Pyrex glass can



be melted in a graphite crucible. Zinc, lead and other low temperature, high-resistivity metals and alloys can be used.

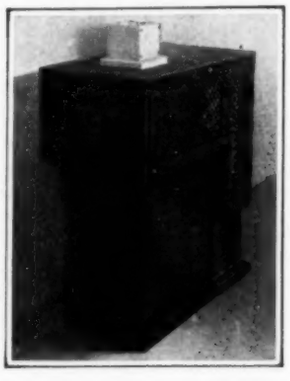
The furnace is made in two standard sizes: the larger size operates from a 35-kva. converter and holds a No. 25 crucible. It melts about 65 lb. of brass at a time. The smaller size is for use in melting precious metals.

— 256 —

Furnace, Electric, and High-Frequency Converter, 3-Kva.

Ajax Electrothermic Corporation, Ajax Park, Trenton, N. J. [Vol.68,p.440]

This unit is especially suitable for dental alloys, jewelers' work and research laboratories. It is particularly adapted for the study of gases in metal and is well suited to handle pieces of metal of a size suitable for carrying on such experiments. It also has uses for production



work where small quantities of metals are to be melted, heat-treated or annealed. The frequency of oscillation is about 40,000 cycles per second.

The whole equipment is contained in a metal cage 32 in. high. It weighs about 500 lb. complete and includes transformers and condensers as standard equipment. The transformer is fitted with external reactance taps which can be varied to suit the particular conditions.

In this furnace 9 oz. of iron were melted in 10 min. in a non-conducting crucible.

— 257 —

Furnace, Electric, Pot-Type, Lead Hardening

General Electric Co., Schenectady, N. Y. [Vol.68,p.515]

The principal features of the furnace as listed by the manufacturer are minimum current consumption, uniform quality of product, lack of contact of pot with shell or cover of furnace, use of direct-heat, unmuffled heating unit of the

metallic-resistor type, ease of removal of pot, improved working conditions which result, and reduced fire hazards.

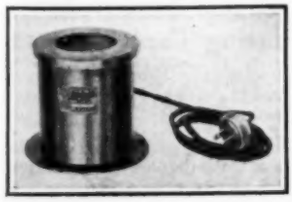
The furnace may be used for lead hardening of chisels, files, drills, taps, dies and similar small parts. It is made in four sizes with capacities ranging from 75 lb. of steel per hour to 250 lb. of steel per hour at 1,500 deg. F. The connected load varies from 11 kw. for the smallest size to 29 kw. for the largest size. The voltage required for the two smaller sized furnaces is 75 volts and that for the larger sizes is 220 volts.

— 258 —

Pot, Tinning, Portable, Electric

General Electric Co., Schenectady, N. Y. [Vol.68,p.235]

This device, which bears the designation RP form C, is built on the same principle as the larger G-E melting pots. The heating unit which is of the cartridge type dissipates 150 watts. It is placed in a boss cast on the bottom of the crucible and is readily removed. The crucible and base are made of cast iron, while the jacket is of sheet steel. The connecting lead is a heavy Deltabeston heater cord, and the plug is of the armored type.



This pot is particularly designed for solder and tin having a maximum operating temperature of 500 deg. F. Although the pot is normally designed for operation on an 110-volt circuit it can also be supplied for operation on 100-, 120- and 240-volt circuits. It has an approximate shipping weight of 6 lb. The pot has a diameter of 2¼ in. and a depth of 1 inch.

— 259 —

Glue Pot, Electric

Black & Decker Manufacturing Co., Towson, Md. [Vol.58, p.714]

This compact electric glue pot of 2-qt. capacity has a thermostatic control which maintains the glue at a temperature of 150 deg. F. so that the best working consistency for smooth

tight joints is always available. The heating element is made from Nichrome ribbon wound on mica plates and is tightly sealed with asbestos to eliminate fire hazard.

The glue container is an aluminum casting machined to fit an iron receptacle in such a manner that heat is conserved as far as possible. The sides of the pot are sloped to minimize spillage and a heavy iron wiper across the center of the glue container prevents drippage.

— 260 —

Baths, Oil Tempering, Redesigned

General Electric Co., Schenectady, N. Y. [Vol.68,p.989]

These electrically-heated units for oil tempering carbon steels have been redesigned without any changes in dimensions. The redesign is intended to simplify the periodic cleaning of the heating units and to prolong their life. The heating units are now fastened to the flange on the tank instead of to the protective apron over the terminals. To remove the unit, it is only necessary to remove six screws holding the protective apron in place, after which the units can be taken out one at a time. The terminals for these units are sealed instead of being the open porcelain type.

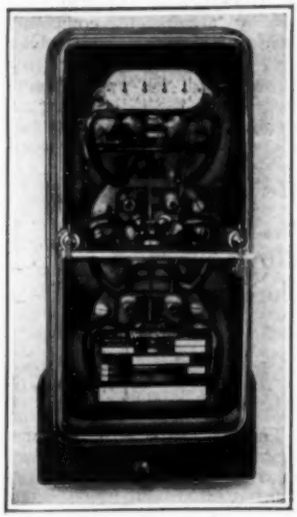
— 261 —

Meter, Watt-Hour, Three-Element, Type O B

Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa. [Vol.68,p.906]

Correct energy measurement may be made regardless of current unbalance, voltage unbalance, or power factor by means of this type OB three-element watt-hour meter, designed primarily for use on three-phase, four-wire circuits where a high degree of accuracy is required.

In construction the meter con-



sists essentially of three single-phase elements placed one above the other, having all three disks mounted on a common shaft. The torques of the three elements are totalled and the energy measured on one register. Each element has an adjustable power-factor loop and is fully compensated for variations in temperature. The meters are made for either house-type or switchboard mounting.

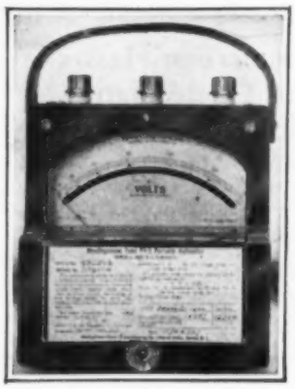
— 262 —

Instruments, Portable

Westinghouse Electric & Manufacturing Co., E. Pittsburgh, Pa. [Vol.68,p.903]

The compact d.c. instruments known as type PX2 are suitable for automobile batteries, and miscellaneous testing. The a.c. instruments are designated as PY5 and are of the direct-reading type suitable for general testing and laboratory work.

The d.c. instruments are of the permanent-magnet, moving-coil type and operate on the D'Arsonval principle. This line includes millivoltmeters,



double-range voltmeters, milliammeters, ammeters, radio-frequency ammeters, and galvanometers.

The a.c. voltmeters and single-phase wattmeters are of the electrodynamometer type. The ammeters are of the moving-iron type using vanes of non-residual metal. All instruments are shielded and damped. The ammeters have a double range. The movements will successfully stand high momentary overloads, and they may be used on circuits up to 500 cycles, and also on d.c. with but a slight reduction in accuracy.

The voltmeters are accurate to within ½ per cent and can be used without appreciable error on d.c. and a.c. up to 133 cycles. The single-phase wattmeters are accurate to within ½ per cent and may be used on circuits up to 400 cycles. The current circuits are double range with a series-parallel arrangement of coils, and are controlled by a switch.

— 263 —

Brake, Solenoid

General Electric Co., Schenectady, N. Y. [Vol.68,p.633]

This line, bearing the designation of CR-9516, includes brakes for operation on a.c. and d.c. circuits and involves in its construction the use of a spring-setting device which forces the mechanism into action when the power is shut off. The brakes

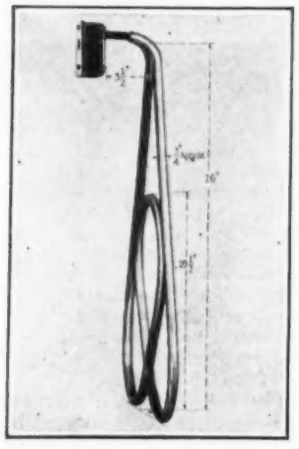
are designed for severe service in connection with mill, crane, and hoist motors. They are claimed to make quick stops in either direction of rotation with a dependable holding value. Both the a.c. and the d.c. brakes use the same brake mechanism and frame, the solenoids being interchangeable. They can be mounted in any position, have adjustable torque, and have simple and accessible overhead lever construction.

— 264 —

Immersion Heater for Electroplating Solutions

General Electric Co., Schenectady, N. Y. [Vol.68,p.37]

This electric immersion heater is suitable for use in electroplating solutions and other liquids that will not attack lead and is intended for low-temperatures only. The device consists of a steel-sheathed helicoil unit covered with a lead jacket



swaged tight to the steel unit. It is made in two sizes, both rated at 5 kw., for 110-volt and 220-volt circuits. Only the lower portion of the heater dissipates heat so that it can be used in tanks in which the level of the solution may be as low as 10 in. from the top of the tank.

Among the advantages claimed for this unit are its ease of installation, portability, the lack of interference with work in the tank, and the minimum maintenance expense. The heater can be supplied in other formations than the one shown.

— 265 —

Plug, Soft-Rubber

Beldon Manufacturing Co., 2300 S. Western Ave., Chicago, Ill. [Vol.68,p.277]

The plugs are made of solid, soft rubber and can be dropped or knocked about without injury. They are shaped to form a convenient grip for the fingers when plugging in or pulling out, and are attractive in appearance. The insulating qualities make them suitable for use in damp places, and the soft rubber construction makes them desirable for all devices that require a non-breakable plug for uninterrupted service. The plug is made in different shapes for various uses.

Cords with plug attachments are furnished in 10-, 20-, and 50-ft. lengths.

— 266 —

Cord Sets, "Flex," All-Rubber

General Electric Co., Merchandise Department, Bridgeport, Conn. [Vol.68,p.477]

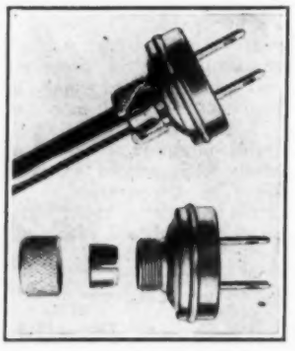
Cord sets made up in 10- and 20-ft. lengths of Nos. 5, 16 and 18 type SJ GE-Flex Junior all-rubber cord are available. One end of the cord has an all-rubber cap and the other end is stripped ready for wiring. This set may also be obtained with a pony attachment compound plug body and an all-rubber cap. The cord and cap consist of one mold, the prongs being molded into the cap so that no wiring of the cap is necessary. The set is particularly recommended for hard service.

— 267 —

Plug Cap, Cord-Grip, No. 7784

Cutler-Hammer Manufacturing Co., Milwaukee, Wis. [Vol. 68,p.1062]

This unbreakable attachment plug cap has an improved type of cord grip which acts as a positive strain relief and is designed to lessen short circuit hazards. Fastening of the cord



grip can be done without the use of tools as it is only necessary to screw down on a knurled collar.

The parts are so designed that when screwed together they resist loosening. The knurled collar wedges a fiber bushing tightly against the cord. The bushing serves to insulate the cord from metal parts and to prevent damage to the cord. An armored shell made of brass prevents damage when the cap is dropped. Sheet Bakelite is used to hold the blades.

— 268 —

Switch, Fixture, "Levolier," No. 61

McGill Manufacturing Co., Valparaiso, Ind. [Vol.68,p.557]

Individual control and reliable operation are features of this No. 61, fixture switch which is

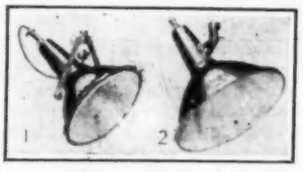
used for industrial lighting where high wattages are necessary. The actual size is 1⅞x⅞ in., and it is therefore, suitable for shallow ceiling pans and canopies. All of the current-carrying parts are of heavy section; while the make and break is designed to minimize arcing.

— 269 —

Fixtures, Lighting, Industrial

Benjamin Electric Manufacturing Co., Chicago, Ill. [Vol. 68,p.554]

These three industrial lighting fixtures are known as the Projectolite, the Intensifier, and



the 45-deg. Aligner. The first-named is designed for illuminating straight and rounded surfaces from an acute angle. By means of a special lens, the flood-light beam is flattened and broadened so as to direct a greater part of the light to a point farthest from the light source, and an even illumination over the entire surface is obtained. The Intensifier is used to concentrate an intense light upon certain small areas. Intensities of illumination range from 35 to 250 ft. candles, depending upon the wattage of the lamps used.

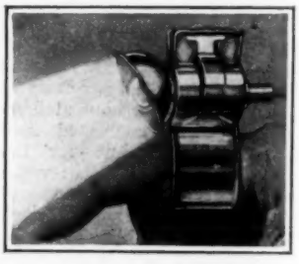
The 45-deg. Aligner is for use in industrial locations where the lighting fixtures are suspended directly from the outlet box. This aligner permits the fixture to hang plumb, and protects it from jars and shocks due to the ball and socket design.

— 270 —

Lamp, Finger, "Digit"

Digit Manufacturing Co., 272 Lafayette St., New York City. [Vol.68,p.595]

This lighting device, which is nickel finished, can be clamped quickly on the finger or a tool,



and makes an all-purpose trouble lamp. It uses a 2½-volt Mazda bulb and comes with 4 ft. of cord.

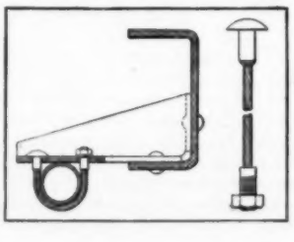
Miscellaneous Equipment, Materials and Supplies

— 271 —

Flexible Bolt, "Tru-Lay-Tru-Lock"

American Cable Co., 215 N. Michigan Ave., Chicago, Ill. [Vol.68,p.516]

Preformed type of wire may be cut like a rod and with a close-fitting attachment slipped



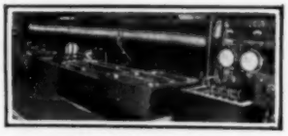
over the unseized end, it may be processed so that the steel of the fitting becomes practically an integral part of the wire. Such fittings can be threaded for a nut or capped for a head. The resulting flexible bolt is available in varying lengths. It can be used where a rigid U-bolt is impractical.

— 272 —

Exhaust System for Plating Tank Fumes

Cleveland Blow Pipe and Manufacturing Co., Cleveland, Ohio. [Vol.68,p.1067]

Fumes from plating operations, particularly chromium plating, which are dangerous to



the operator, can be removed by an exhaust system now being manufactured and installed by the above company.

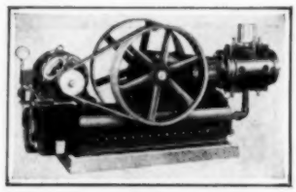
A sheet-metal duct surrounds the top of the tank, and around the side and facing the liquid a narrow slot is cut. A definite volume of air is drawn through this slot at a high velocity, depending upon the size of the tank, and the "suction blanket" thus formed over the tank prevents any of the fumes from entering the room. The operator is therefore protected and his work not interfered with by obstructions.

— 273 —

Compressor, Air, Single-Stage

Pennsylvania Pump and Compressor Co., Easton, Pa. [Vol. 68,p.862]

This semi-portable single-stage, double-acting air compressor is equipped with Pennsylvania air-cushioned valves and contains all other features built into the standard line. The



unit includes motor with automatic stop and start control, starter, multiple belt drive, air receiver and air filter, all assembled into a compact unit.

The unit is equipped with a 10-hp., high-torque motor operating the compressor at a speed of 400 r.p.m. The pressure is automatically controlled between 85 and 125 lb. per sq.in. The unit was designed to meet the demand of the small machine shop.

Overall dimensions: Length, 6½ in.; width, 2 ft. 4 in.; weight, 1,360 pounds.

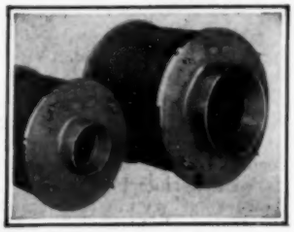
— 274 —

Filters, Air, for Compressors

National Air Filter Co., Chicago, Ill. [Vol.68,p.753]

Two types of air filtering apparatus have been developed for use in the suction lines of compressors. The cartridge-type filters have capacities ranging from 150 to 800 c.f.m., while the semi-automatic "Simplex, Jr." filters were designed in sizes from 800 to 2,500 c.f.m. for medium-sized compressors.

The cartridge filters have the entire cylindrical surface of the drum covered with mats of multiple-ply copper ribbons which do the filtering after being immersed in oil. A large space for dirt accumulations is pro-



vided by several layers of expanded metal which are placed over the copper-ribbon mats. They can be quickly cleaned and renewed.

The Simplex, Jr. filter is semi-automatic in operation, the horizontal drum being rotated through an oil bath by means of a hand crank.

— 275 —

Filters, Air, Pipe-Line

Staynew Filter Corporation, Rochester, N. Y. [Vol.68,p. 1064]

This air filter for pipe lines consists of aluminum housing inclosed in a pressed-steel housing designed to withstand a working pressure of 125 lb. per sq.in. The filter is mounted in-

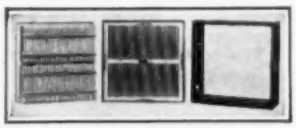
side and consists of a felt medium formed in pockets over radial, wire-screen fins grouped around a central outlet. The inserts are designed to pass 250 cu.ft. of free air per min. and contain 20 sq.ft. of felt within a volume less than 1 cu.ft. A drain cock is provided.

— 276 —

Filters, Air, Panel

Staynew Filter Corporation, Rochester, N. Y. [Vol.68,p.1064]

This panel filter unit is supported in heavy pressed-steel frames as shown. The panel consists of two pressed steel or aluminum frames which support 60 hollow fins or pockets formed of a special rust-proof wire cloth arranged in two rows. Each row of fins is covered with a single piece of special filter material. The efficiency is 99.9 per cent by test and is not decreased by reason of dust or dirt



collecting on the filtering medium.

The size of the filter and frame is 20x20x6¾ in. The capacity of the unit is 800 cu.ft. per min. and the surface of the filtering medium is 45 sq.ft. The velocity of air through the filter is 18 ft. per min. while the resistance to the flow of air is ¾ in. water gage.

— 277 —

Protective Cream

General Electric Co., Merchandise Department, Bridgeport, Conn. [Vol.68,p.1027]

This protective cream is furnished as a safety measure for men whose hands and arms are exposed to oil, grease, dirt, varnish, paint and other causes of skin discoloration and irritation encountered in industrial processes. It is applied before beginning work and forms an invisible film which quickly dries and is not slippery. Subsequent washing in warm water quickly removes it and also the stains which otherwise fill the pores of the skin and become difficult to remove and likely to cause infection. It is packed in tubes and also in 1-lb. cans.

— 278 —

Hand, Compound, "Teggo"

Teggo Manufacturing Co., 1755 N. Troy St., Chicago, Ill. [Vol.68,p.514]

"Teggo" is a white paste which is rubbed into the hands before starting work. It penetrates the pores of the skin where its antiseptic germicidal properties prevent skin diseases from originating in the case of minor abrasions. It leaves a protecting film that can be washed clean with soap.

— 279 —

Steel, High-Speed "Circle C"

Firth-Sterling Steel Co., McKeesport, Pa. [Vol.68,p.392]

An improved high-speed steel known as "Circle C" is available. Tests indicate that with this steel it is possible to cut manganese steel at speeds from 7½ to 15 ft. per min. with cuts ranging from ⅛ to ½ in., and feeds from 1/60 to 1/50 in. The time of the cut between grindings of the tool ran from 1 to 9 hours. Its treatment is similar to alloy high-speed steels.

The steel is intended for the machining of billets, heat-treated forgings, phosphor bronze, and the boring and turning of tires and wheels of railroad equipment.

— 280 —

"Temperite" Alloys

Cornish Wire Co., 30 Church St., New York City. [Vol.68, p.36]

Work can be drawn to within plus or minus 5 deg. F. of the proper temperature by means of "Temperite" alloys. Fourteen of these alloys are available to cover temperatures ranging from 300 to 625 deg. F. in steps of 25 deg. The alloys are supplied

in the form of strips 10 in. long and ⅛ in. wide, and having the melting temperature stamped on each.

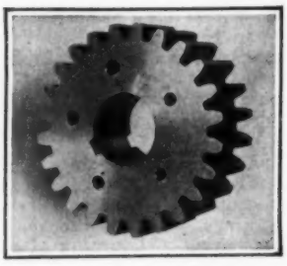
A short piece of the alloy strip is placed on the tool, which is then heated as usual until the alloy melts. In some cases, however, it is easier to apply the alloy in stick form by simply rubbing the proper strip against the tool at intervals until the end melts. It is necessary to use a flux at the point of application. This flux is furnished with the alloys.

— 281 —

Gears, Silent, All-Metal "Double-D"

Flexible Engineering Corporation, 10 E. 43rd St., New York City. [Vol.68,p.196]

These "Double-D" gears are built up of many thin pieces of sheet steel coated with graphite and subjected to high pressure. The noise is broken up and deadened by the laminated structure. Special attention to riveting and spot welding prevents delamination. No solid shrouds are used. The gears must be



cut according to instructions furnished by the company.

The gears are intended for use wherever noise is objectionable and especially where strenuous service is required of them. They operate silently in mesh with each other or with other metal gears. In service Double D gears take on a smooth, glass-like surface due to the graphite impregnated in the teeth.

The gears are supplied principally as gear blanks finished to the required face and approximate diameter, but are not bored nor keyseated.

— 282 —

Cement Gun, "Esso"

S. Obermayer Co., Chicago, Ill. [Vol.68,p.594]

For the maintenance of furnace linings, boiler settings, and similar refractory surfaces, the "Esso" cement gun has been in-

troduced. The features of this gun include ability to build up a refractory wall from ¼ to 1½ in. thick; mechanically mix its own cement; operate on air pressures as low as 30 lb.; spray 25 gallons at one filling; and be operated by one man.

The gun is fed by a brazed tank equipped with an adjustable reducing valve suitable for the air pressure with which the gun is to be used. Air and cement reach the nozzles through two 25 ft. lengths of hose.

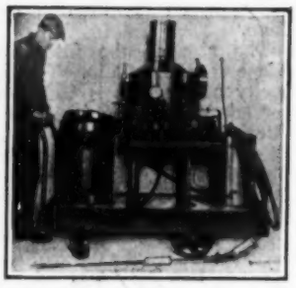
— 283 —

"Hypressure Jenny"

Homestead Valve Manufacturing Co., Homestead, Pa. [Vol.68,p.234]

Hot water, high-pressure spray or hot cleansing fluid in any proportion and at any pressure or temperature, are instantly obtainable with the so-called "Hypressure Jenny." Fundamentally, the outfit consists of a flash steam boiler and the necessary pumping equipment. It is intended for cleaning machines coated with grease and dirt. Wet steam containing cleansing compounds or soap remove heavy grease almost instantaneously.

The fuel and fluid pumps are operated simultaneously so that just the right amount of heat is supplied to the water to change



it into steam. Pure water, soap solutions, or practically any cleaning compound in solution will be delivered at the nozzle, either greatly increased in temperature or in vapor form. The apparatus may be installed permanently or made portable. In its present form, the pumps are operated electrically, but steam turbines may be used. This steam generator or jenny is light and compact enough to be carried about on a small truck.

— 284 —

Lubricator, Portable

Curran Machine Works, Long Island City, N. Y. [Vol.68, p.633]

Proper lubrication of cutting operations where the machine is not equipped for the purpose is

provided by this portable lubricator which directs the lubricant at the tool from a small flexible hose, and which is supplied from a ½-gal. tank resting on the floor. The lubricant is lifted by means of a pump having adjustable flow. Liquids of various densities may be handled, such as turpentine and heavy tapping oil.

— 285 —

Pump, Coolant, Models B and C, "Typhoon"

Tuthill Pump Co., 131 W. 63rd St., Chicago, Ill. [Vol.68, p.1028]

The Model B pump was designed for pressure lubrication of machinery and for hydraulic feeds. It operates on the internal-gear principle and has a "Two-zone" packingless feature, employing a metallic seal which insures freedom from leakage at pressures as high as 500 lb. per sq.in. Two sizes are available, No. 00 size having a capacity of 30 gal. per hour, and the No. 0 size having a capacity

of 90 gal. per hour at 1,800 r.p.m. Both sizes are available in either a foot mounting or the flange mounting type.

The Model C pump is designed for pressures up to 200 lb. per sq.in. and can be furnished for either belt or direct-motor drive. Six sizes, having capacities from 1.5 to 45.5 gal. per min. at 100-lb. pressure are available.

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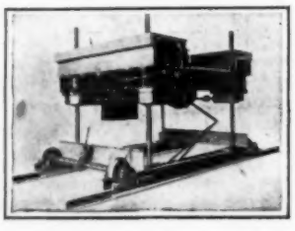
Table, Drop-Pit, Electric, Four-Screw, "Wasco"

Watson-Stillman Co., 75 West St., New York City. [Vol.68, p.1069]

Electric operation is the principal feature of the drop-pit table which has a four-point-supported top operated by four self-locking worm drives always under control of the operator so that the table cannot drop or move without the application of power. Detachable table tops may be obtained in lengths from 5 ft. 6 in. to 11 ft. 10 in. The tops are 10 ft. 6 in. wide with screws spaced 8 ft. 6 in. across to permit clearance for dropping trucks with outside journal boxes. Locking bolts are provided on the top. The shoulders of the top have



heavy oak flooring and the pit, about 18 in. deep as a standard, has matched flooring.

The electrical controls and motor are fastened to the structural steel superstructure of the table. All electrical equipment is waterproof. Bronze bearings with Alemite fittings for greasing are used throughout the drive. The table is normally traversed by a manually operated ratchet, but an electric power traverse can be furnished.

Normally tables are built of 50-ton capacity and will raise the tops 4 in. higher than the track.

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Air Pump, Electric, and Spray Gun, "Mardo"

Demco, Inc., 105 S. Calvert St., Baltimore, Md. [Vol.68, p.237]

The "Mardo" electric air pump illustrated is a single-cylinder type equipped with a standard motor for operation from any light socket. It has a capacity of 1½ cu.ft. of free air per min. A conical-shaped jacket for water surrounds the cylinder. The pump is designed for any pressure up to 75 lb. per sq.in. The total

weight of the unit is 40 lb. and is fitted with convenient handles to make it readily portable.

The Mardo spray gun was developed especially for use with the pump. It is arranged with an automatic vent, so that it is not necessary to use a storage tank or other accessories when painting or spraying with this combination. The complete equipment consists of pump and gun, together with a Mardo purifier. The two units are furnished complete with 10 ft. of hose, and two sizes of nozzles to take care of light or heavy liquids.

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Touch-Up Gun, Type K-Jr.

Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md. [Vol.68,p.355]

The fine mist or spray produced by the type K-Jr. gun is desirable for decorating, shad-

ing, high-lighting, and blending of colors on any surface, touching-up scratches, mars or dents in automobile bodies or machinery, and numerous other fine painting operations, using lacquer, varnish, or paint.

The liquid is completely

atomized, and the gun can be adjusted to secure a fine hair-line spray for certain types of work. With a multiple head, it is possible to obtain a flat horizontal or vertical spray or a round spray. The construction is sturdy throughout, and is designed for easy cleaning. The gun will operate with a ½-hp. air compressor.

Furnished with the gun are 6 ft. of air hose with connections. Various containers of either aluminum or glass, can be furnished with air-tight caps so that various color paints can be kept in condition while in the cup.

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Screw Jacks, "Simplex"

Templeton, Kenly & Co., Ltd., 1020 S. Central Ave., Chicago, Ill. [Vol.68,p.318]

Instead of the solid frame, these jacks are built with an open handhole, permitting the screw of the jack to be visible at all times. The carrying handle is formed as a portion of the handhole, and is braced and ribbed for strength.

The screw and head are forged from a single piece of

steel, while the standard and cap are made of gray iron. The base is formed with an extra ribbing for stability and strength.

As an aid to more effective handling, each size is lacquered in a different color. Thirty-two sizes are available in all, ranging from 5 to 36 tons capacity, and from 8 to 29 in. closed height.

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Work Benches, Steel

Pollard Bros. Manufacturing Co., 4039 N. Tripp Ave., Chicago, Ill. [Vol.68,p.393]

Standard lengths of these work benches are 3, 4, 5, 6, 8, and 9 ft., and the widths are 24, 29, 32½ and 46 in. The height varies from 25 to 35 in., accord-

ing to requirements, but the standard heights of bench legs are 32½ and 35 in. They can be equipped with end plates and back plates to prevent material from sliding off the bench.

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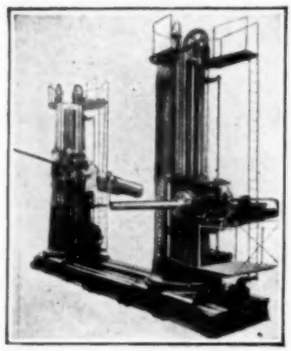
Boring Machines

— 1 —

Boring Machine, Horizontal, Duplex, Universal

W. Asquith, Ltd., Halifax, England. [Vol.67,p.299E]

This duplex, heavy-duty, electrically driven, full-universal horizontal drilling, boring, milling, and screw-cutting machine was built for dealing with submarine baseplates, gun cradles, large cylinders, and for heavy work generally. The maximum horizontal height to centers of spindles is 18 ft. and minimum distance, 6 ft. Each drilling head is driven independently by a 15-hp. variable-speed motor.



Both column and drilling head on one unit are arranged to swivel, while on the other the column is fixed.

The traverse bed is 30 ft. by 6 ft. The spindle saddles have a vertical traverse on the columns of 12 ft. by power and also fine hand adjustment. Variable power feeds for milling are provided. One saddle only, swivels through 70 degrees.

The spindles are 7 in. in diam. Reverse motion for tapping is available and provision is made for screw-cutting on each spindle. The spindle speeds range from 1½ to 150 r.p.m. Eight feeds are provided to the spindles, eight speeds to the saddles up and down the columns, and eight feeds to the columns on the traverse bed. The spindles have a vertical traverse of 7 ft.

Total overall height 23 ft. 6 in.; weight 62 tons.

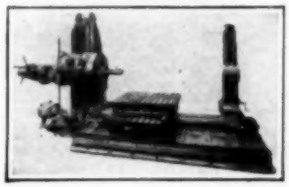
— 2 —

Boring Machine, Traversing-Spindle, Pearn-Richards, No. 6

G. Richards & Co., Ltd., Broadheath, Manchester, England. [Vol.68,p.6E]

A boring machine which can be used for surfacing, boring, milling, drilling, and tapping has been brought out by this firm. The machine will face and edge flanges up to 60 in. in diam., facing up to 72 in. in diam. by the use of an extension toolholder. The spindle is 6 in. in diam. and has a total traverse of 72 inches.

The 12 spindle speeds range from 23 to 183 r.p.m., and the facing head has 24 independent speeds, ranging from 1.25 to 110 r.p.m. The machine has eight reversible feeds to the facing slide. Eight feeds are also provided to the table longitudinally and transversely, and to the



spindle traversing slide; also to the spindle frame vertically. Rapid power traverse is also available for the table longitudinally and transversely and for the spindle frame vertically.

The machine has two tables, the lower being 11x5 ft., and the top table 6 ft. square. The top table can be indexed to any required angle. The bottom table has automatic longitudinal traverse of 6 ft. 6 in. and an automatic cross traverse of 9 ft. 5 in. The spindle center height can be adjusted from 4¾ to 66 in. above the revolving table, the maximum distance between the boring stay and the boring bar socket on the facing head being 12 ft. 6 in. The bed is 9 ft. wide over the outer slide.

Power required 17½ hp.; weight 39 tons.

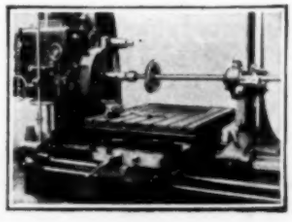
— 3 —

Boring Machine, Horizontal

Selson Engineering Co., Ltd., Charles Street, London, E. C., England. [Vol.68,p.149E]

This line of standard horizontal drilling, boring, and milling machines is made by Karl Wetzel, Gera-Reuss, Germany, in four standard sizes with 3½, 4¼, 5¼ and 5¾-in. diam. spindles, and is being marketed in England by the above company.

Power feeds with adjustable stops and knockoff motion are



provided in both directions and a rapid power traverse, independent of the spindle speed, is available for the saddle and the table. The height of the saddle and steady bearings and the setting of the table is to scale and vernier. The work table can be revolved either by power or by hand.

The largest machine will bore work up to 39¾ in. in diam., and flange up to 49¼ in. in diam. The spindle speeds range from 1.5 to 170 r.p.m., the feed range being 0.004 to 0.5 in. per rev. in 8 steps, or with change gears from 0.004 to 0.66 in. per rev. in 24 steps. The working surface for the rotary table is 63 x 75 in. The maximum height of the spindle over the table is 70¾ inches.

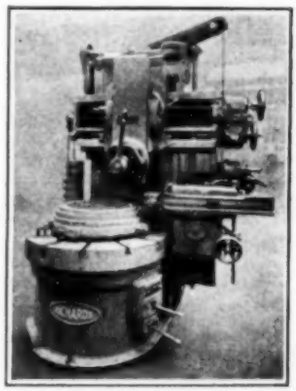
The longitudinal and cross feeds of the table and the vertical feed of the saddle are from 0.001 to 1 in. per rev. in six steps, the rapid traverse of spindle being 47¼ in., and of the table longitudinal and cross, and saddle vertically, 43 in. per minute.

— 4 —

Boring Mill, Vertical, with Side Head, 48-Inch

G. Richards & Co., Ltd., Broadheath, Manchester, England. [Vol.67,p.203E]

This vertical boring and turning mill will admit work 50 in. in diam. by 48 in. under the turret, or 36 in. under the cross slide. The table takes a 48-in. chuck. The vertical movement



of the turret is 30 in., and its horizontal movement from the center 27½ in. Twelve speeds are provided. The vertical head swivels 45 deg. each side of the vertical, fine setting for this being obtained from an index ring.

The handwheels on the vertical and side heads have a limited free angular movement in order that a slight kick may be given to the clutch, thus providing fine adjustment of feed. The three adjusting handwheels have large indexing rings which can be set and read to 0.001 in., and the cross slide, down-feed slide and side tool bars have rules and verniers.

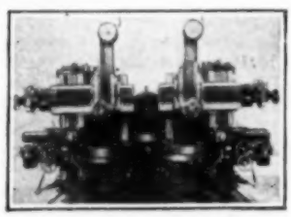
Rapid power motion shafts are mounted on ball bearings, and run continuously to reduce non-productive time. Each head has its own feed box giving eight changes, the heads being independent.

— 5 —

Boring Mill, Duplex

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.67,p.219E]

This duplex boring and turning mill consists essentially of two standard 36-in. machines bolted together but with side heads arranged right and left hand. It is driven by a single constant-speed motor of 15 hp.,



with separate control to each side. The tables have eight speeds, ranging from 4 to 54 rev. per minute.

Actual swing with the side head in use is 40 in., and with the side head down 43 in. The maximum height admitted under the cross rail is 24 in., and under the turret face 32 in. The travel of the head on the cross rail is 34 in. The vertical travel of the main ram is 20 in. and the movement of the side head of the ram is 18½ in. horizontal by 23 in. vertical.

Each head has six feeds, ranging from $\frac{1}{64}$ to $\frac{1}{4}$ in. per rev. in the case of the main head, and from 1/100 to $\frac{1}{16}$ in. for the side head.

Weight about 14 tons

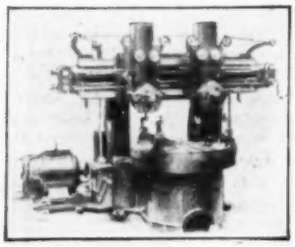
— 6 —

Boring Mill, Tire, Locomotive

Ward, Haggas & Smith, Keighley, England. [Vol.67,p. 228E]

A 20-hp. motor drives this 42-in. locomotive tire boring mill through spur gearing. The table is 48 in. in diam., and the final drive is taken by an external wheel secured to the back of the plate. There are four special jaws formed in three pieces. The top plate is shaped to suit the tire profile and is T-slotted into the middle portion. Sixteen speeds are provided for the table.

Each turret head has an independent movement along the



cross slide, either by hand or power, and the hand movements to either head can be controlled from either end of the cross-slide. The vertical adjustment provided to the slides is 12 in. either by hand or power.

Four feeds and reverse motion are obtained, plus double gear motions at both ends of the cross slide. The boring feeds range from 4 to 80 rev. per in. of traverse and the facing feeds from 2 to 40 rev. per inch.

Floor space 9 ft. 6 in. x 8 feet.

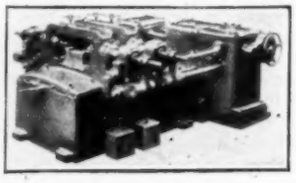
— 7 —

Boring Machine, Radiator Section

White Machine Tool Co., Ltd., Halifax, England. [Vol.68,p. 137E]

Radiator sections is the work for which this self-contained machine was designed. The operations include boring four cored holes to 1¼ in., tapping three holes, and facing the bosses. The machine has four main horizontal spindles, arranged in pairs facing each other. Each spindle is bored to No. 11 B & S taper, and screwed to receive the special cutters.

The bearings are mounted on saddles and locked by bolts placed in T-slots. This arrangement provides endwise positioning of the cutters to admit radiator sections of different widths.



The maximum and minimum centers of the spindles are 3 ft. and 7 in., respectively; and height of centers 2 ft. 11½ inches.

The bed is 5 ft. 7 in. long by 3 ft. 5½ in. wide. The 12½-hp. motor is mounted inside the main gear box. Adjustment is provided for each spindle for time of commencing to feed independently of the other, so that all the four spindles may be feeding into the work simultaneously, or in alternate pairs.

Weight 7,500 lb. approximately.

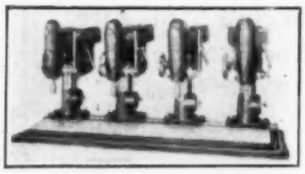
Drilling Machines

— 8 —

Drills, Sensitive, High-Speed

G. H. Alexander, Ltd., Birmingham, England. [Vol.68,p. 96E]

These high-speed drills for holes up to 0.2 in. in diam. are manufactured by Ludw. Loewe & Co., Berlin, Germany. The spindle is short and carried in a sleeve on ball bearings. No spindle end projects. The head carries the spindle, the sleeve,



the feeding device, the driving pulley, and the motor.

The drill head has adjustment of about 4 in. on the round pillar. The maximum drilling depth is 2 in. and the greatest distance between the table and the drill chuck is 5¾ in. A stop is provided for drilling to depth and the drill spindle has a Morse taper to take a drill chuck.

The column can be adjusted lengthwise on the baseplate and the machine is available with any number of spindles up to four. It is intended for drilling various materials, including aluminum, bronze, wood, hard rubber, cast iron, and steel, and is therefore arranged for three ranges of speeds, 8,000 to 12,000 r.p.m., 4,000 to 6,000 r.p.m., and 1,500 to 4,500 r.p.m., each in three steps.

— 9 —

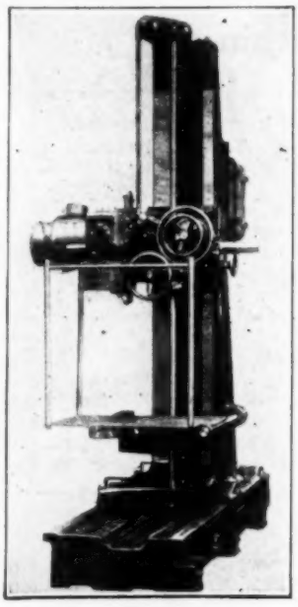
Drilling Machine, Horizontal

W. Asquith, Ltd., Halifax, England. [Vol.68,p.162E]

The motor-driven horizontal drilling machine shown here is a general-purpose tool with an effective range of 6 ft. vertical by 6 ft. horizontal. The driving motor is mounted on the spindle slide. Power feed is applied automatically when the drill makes contact with the work.

The bed is 9 ft. 4 in. long, by 2 ft. 8 in. wide. The standard has a horizontal movement of 6 ft. Spindle speeds range from 45 to 500 r.p.m. The 5-hp. motor provides sufficient power for drilling holes up to 2 in. in diam. from the solid. The spindle has a total feed of 15 in., and is bored No. 5 Morse taper.

Four power feeds are provided, 29, 44, 66, and 97 cuts per in. Ball bearings are fitted where necessary on the saddle. A lubricant pump is provided. The minimum distance from center of the spindle to under side of the traverse bed is 2½ feet.



Approximate weight 3 tons.

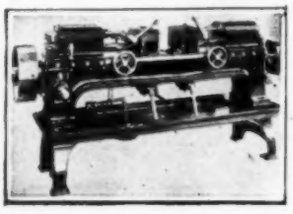
— 10 —

Drilling Machine, Horizontal, 8-Spindle

William Heap & Co., Ltd., Ashton-under-Lyne, England. [Vol.68,p.109E]

This is a special eight-spindle horizontal drilling machine for drilling four cast-steel brackets simultaneously, each with two ¾ in. holes suitably pitched. The bed is 5 ft. 3 in. long. The drilling heads are mounted at the ends of the bed, two jigs, one for each head, being carried on the middle of the bed. Each jig holds two brackets secured by a cam-locking device. The jigs have screws and quick clamping arrangements so that they can be moved quickly away from the drills. The spindles are 1¼ in. in diam., there being four to each head. Drills can be changed quickly.

The heads may be stopped or started independently. The drills are fed to the work through a scroll cam; they knock-off when the required depth of hole has been drilled and return to the starting point automatically. The cams can be arranged to dwell when the heads return to the starting point, or they may be arranged to stop until the feed motion is engaged by hand. A coolant pump is provided.

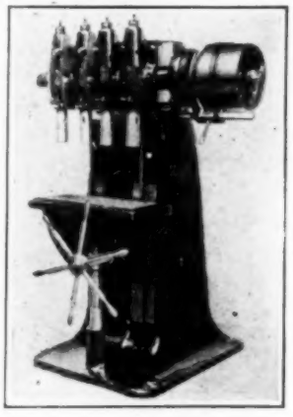


— 11 —

Drill, Upright, Four-spindle

Selson Engineering Co., Ltd., Charles St., London, E. C., England. [Vol.67,p.231E]

A four-spindle drill which is especially designed for drilling four holes simultaneously in the vaporizer exhaust manifolds of motor cars. The four spindle heads can be adjusted to various center distances, the minimum center of the inner spindles being 3¼ in., and the maximum center between the outer spindles, 1 ft. 9 in. The drive to the



machine is by fast and loose pulleys, 12 in. in diam. by 3½ in. wide, through spur gearing to a long spiral gear running the full length of the cross-head and driving corresponding gears on the spindles.

Each spindle is 1¾-in. diam. with the nose bored for No. 4 Morse taper. Hoffmann ball races take the pressure of the cut. The table has a top 24 in. by 9 in. in area. It is fed upwards by pilot wheel, spiral gearing, and screws, the vertical traverse being 12 in. If desired, power feeds may be provided.

Weight 2,200 pounds.

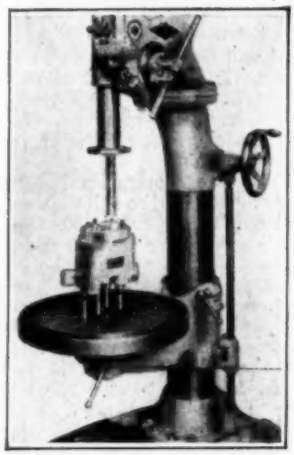
— 12 —

Drills, Vertical, Multiple-Spindle

J. Archdale & Co., Ltd., Birmingham, England. [Vol.68, p.60E]

The above firm supplies its all-geared vertical drilling machines in a slightly modified form especially suitable for use with multiple-spindle heads. The illustration shows the drill spindle and supporting sleeve of the firm's 28-in. machine which has a spindle 1½ in. in diam., and will, in the ordinary form, drill 1½ in. holes.

Nine spindle speeds are available from 67 to 760 r.p.m. The drill spindle bears a flange at the end drilled to suit studs that are secured in the multi-spindle attachment. The driving spindle, which takes the place of the drill spindle, is slotted to form a tang on the end of the central driving shaft on the



multiple-spindle attachment. This method of mounting is claimed to be much more rigid than that usually adopted.

When multiple-spindle heads are mounted on a flanged sleeve the nine-speed box is replaced by a box of the change-gear type giving the spindle speeds required. The attachment shown has six spindles, three for drilling and three for reaming, the spindle speeds being 385 and 187 r.p.m. respectively.

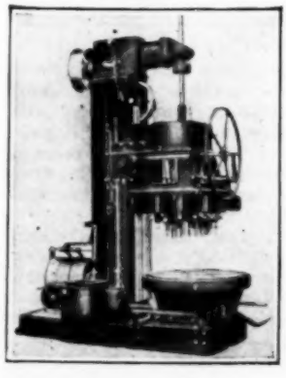
— 13 —

Drill, Vertical, Multiple-Spindle

A. C. Wickman, Ltd., Coventry, England. [Vol.68,p.95E]

This multiple-spindle vertical drill is designed to drill twelve holes ¾ in. in diam., or eight holes 1 in. in diam. in cast iron; or twelve holes ⅝ in. in diam., ten holes ¾ in. in diam., or six holes 1 in. in diam. in steel. It is manufactured by Wanderer-Werke, A. G. Schonau, Chemnitz, Germany, and marketed in England by the above firm.

With the spindles arranged in a circle the maximum diameter



is 15¾ in.; and the maximum rectangular area covered is 21¾ x14⅜ in. The distance from the center of the spindle head to the face of the upright is 15¾ in., the maximum distance from the base plate to the spindle ends being 38½ in., and the working surface of the baseplate 27½x31 in. The spindle head has a vertical traverse of 21¾ inches.

Each spindle has six speeds ranging from 158 to 650 r.p.m. Thus large and small holes can be drilled simultaneously or may be drilled and reamed simultaneously. The spindles are adjustable both vertically and horizontally. The minimum distance from center to center is 2⅛ in. Six feeds from 1 to 6 in. per min. are provided.

The machines are generally supplied with a circular table 34½ in. in diam., the maximum distance from this to the spindle ends being 22½ in., and the minimum distance ⅜ in. A reversing fixture for tapping can be added.

Weight 9,600 lb. with circular table.

— 14 —

Multi-Drilling and Multi-Tapping Machines

J. Archdale & Co., Ltd., Birmingham, England. [Vol.68, p.174E]

These multi-spindle drilling and tapping machines, both vertical and duplex horizontal, consist essentially of standardized units. They are made in two sizes. The drilling and tapping heads of all machines are interchangeable. The main driving

gears are of alloy steel, heat-treated and ground, and the spindles are of case-hardened steel running in phosphor-bronze bearings, or heat-treated chrome vanadium steel running in ball or roller bearings, according to location.

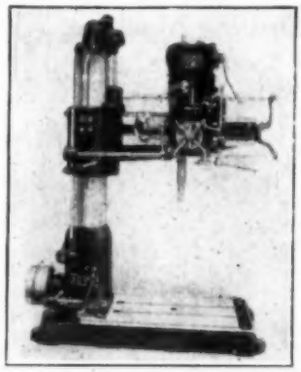
Handwheel feeds are interlocked with the automatic feeds. On the horizontal machine, the large type has a maximum distance between spindles of 48 in., and the small machine of 40 in. In the vertical machine in both sizes the distance from the spindle to the base is 40 in., and the independent vertical adjustment of the spindles is 1 in. The large machine has a traverse to the spindle slide of 24 in., the distance from the center of the head to the body being 11¾ in., and the maximum number of spindles in the head 36. The smaller machines have a vertical traverse to the spindle slide of 18 in., and the maximum number of spindles in the head is 20.

— 15 —

Drill, Radial, 3½-Foot

F. Town & Sons, Halifax, England. [Vol.68,p.20E]

This radial drill is arranged for direct motor drive and centralized control. Both the saddle and sleeve are mounted on ball bearings, and a combined lock is provided for saddle and sleeve. The saddle has a trav-



erse of 2 ft. 4 in. along the arm. The arm is of tubular section, with power motion on the sleeve of 2 feet.

The spindle has a feed traverse, both hand and power, of 12 in. The maximum distance between the spindle and the baseplate is 4 ft. 2 in. The spindle weight is balanced by a spring.

The eight spindle speeds provided range from 750 to 40 r.p.m. The three independent feeds range from 39 to 116 cuts per in. For fine adjustment of the spindle, a slow hand feed is available, and a sensitive hand lever feed is also available. The baseplate is 3 ft. 6 in. long by 2 ft. 8 in. wide.

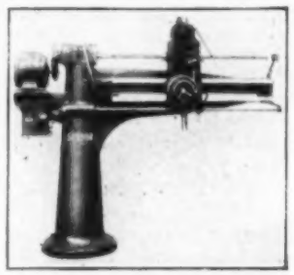
Weight 4,000 lb. net.

— 16 —

Drill, Radial, Girder, 6-Foot

Selson Engineering Co., Ltd., Coventry, England. [Vol.68, p.137E]

The three sizes included in this line of girder radial drilling machines are 5, 6 and 7 ft. In



all three machines the minimum radius of spindle is 1 ft. 7 in., the maximum distance from the spindle to the floor is 4 ft. 3 in., and the spindle traverse is 1 ft. 2 in. The four spindle speeds in each machine range from 185 to 460 r.p.m., and the three feeds are 45, 76 and 118 cuts per inch.

The spindle is of carbon steel, running in a steel sleeve bushed with phosphor-bronze. End thrust is taken by ball bearings, and the spindle is spring-balanced.

Starting, stopping, and reversing are effected by a conveniently-placed hand lever, which controls a friction clutch. The automatic feed is obtained through a positive clutch and can be changed quickly while the machine is running. Fine feed is provided by a conveniently-situated handwheel.

Weight 4,000 pounds.

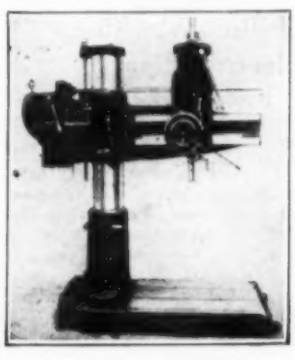
— 17 —

Radial Drill, Self-Contained, 3½-Foot

Selson Engineering Co., Ltd., Coventry, England. [Vol.68, p.162E]

The motor of this self-contained machine is mounted on an extension of the arm. The maximum radius of the spindle is 3 ft. 7 in., and the minimum radius 1 ft. 3 in. The maximum height of the spindle from the base is 4 ft. 3 in. The inner and outer columns, and the carriage, are mounted on ball bearings.

The arm has a vertical movement of 2 ft., and the spindle has a vertical traverse of 12 in. End thrust is taken by ball bearings. Provision is made for withdrawing taps at five times the tapping speed. The eight spindle speeds range from 25 to



500 r.p.m. Feeds are in three rates from 1/46 to 1/120 in. per rev. The working surface of the baseplate is 3 ft. 6 in. by 2 ft. 8 inches.

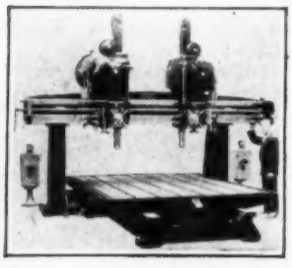
Floor space 6 ft. 8 in. x 3 ft. 2 in.; weight 3,900 pounds.

— 18 —

Drill, Crossrail, Two-Spindle

W. Asquith, Ltd., Halifax, England. [Vol.67,p.219E]

A two-spindle crossrail drill specially adapted for drilling and tapping holes up to 3 in. in diam. from the solid in locomotive tube plates. The maximum and minimum center distances of the spindles are 8 ft. 6 in. and 11 in., respectively. The drilling heads are made right



and left hand and are adjustable on the crossrail, independently or simultaneously from either side.

The saddles are each arranged to carry a 7½-hp. driving motor and to incorporate a gearbox giving twelve spindle speeds, ranging from 30 to 300 r.p.m. The spindles are 2¼ in. in diameter.

The four positive self-acting feeds give 35 to 120 cuts per in. of traverse. The spindles have automatic trip motion up to 5 in. in depth. Fine hand adjustment is provided, as well as reverse motion for tapping. The spindles have a vertical traverse of 18 in. The distance between the uprights is 8 ft. 6 in. The worktable is arranged to traverse 10 ft. along the bed. The table has a working surface 10x8 ft. An index assures accurate spacing of the work. The maximum distance from the spindle nose to the top of the table is 1 ft. 9 inches.

Weight 14¾ tons.

— 19 —

Drilling Machine, Electric, Hand

Siemens Schuckert, Ltd., 109 Kingsway, W.C., London, England. [Vol.67,p.233E]

This line of electric hand drilling machines was designed for continuous heavy-duty. The machine is designed for either direct or three-phase current. Ball bearings are fitted throughout, including a ball thrust bearing on the drilling spindle. The motor and gear cage are totally inclosed so that no moisture or water can enter.

The machine is fitted with two grip handles placed in such a position that the machine is well-balanced. The control switch is placed conveniently between

the handles and is readily accessible for testing. The flexible cable is connected direct to the switch, and the design of the gland prevents damage to the cable at that point.

The machines are available with two-jaw chucks for drilling ⅝-in. holes and with spindle bored No. 1 Morse taper for ⅝-in. holes.

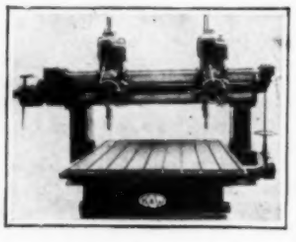
The heaviest machine weighs 16½ pounds.

— 20 —

Drilling Machine, Locomotive Tube-Plate

Kitchen & Wade, Halifax, England. [Vol.67,p.316E]

This locomotive tube-plate drilling and tapping machine has a distance between standards of 8 ft. 6 in., and a maximum distance from the spindle nose to the table top of 2 ft. The machine can drill 4-in. holes from the solid in cast iron and 3½-in. in mild steel. Whitworth threads up to 3 in. in diam. can be tapped and boring can be performed up to 15 in. in diam., while trepanning up to 20 in. in



diam. can be done. Twenty-seven spindle speeds ranging from 400 to 10 r.p.m. are provided.

The two drilling heads can be used either independently or simultaneously and have maximum spindle centers of 8 ft. 6 in. and minimum centers of 2 ft. 4 in. Each spindle has a vertical power traverse of 20 in. Each spindle is bored No. 5 Morse taper and is also cottered to permit the use of boring bars and tapping attachments.

The power feed has six rates varying from 30 to 150 cuts per in. The tap can be backed out at a speed of 4 to 1. The saddles, with rack and pinion motion on the crossrail, are carried on ball rollers. The table has a working surface of 10x8 ft. and has 8 ft. traverse along the bed.

Floor space 16 ft. x 18 ft. 9 in.; weight 12¾ tons.

— 21 —

Drill, Billet

F. Town & Sons, Halifax, England. [Vol.68,p.8E]

This vertical billet drilling machine is especially adapted for drilling 1¼ in. holes in 4 in. square 0.7-carbon steel billets at a penetration speed of about 3 in. per min. The holes are drilled half way through, when the billet is reversed and the hole completed.

A box-section standard is mounted on a baseplate measuring 4 ft. 8 in. by 2 ft. 4 in. At the top of the standard a four-speed gearbox provides spindle speeds ranging from 100 to 250 r.p.m. Three positive geared feeds give 45 to 95 cuts per in. The spindle has a vertical traverse of 17 inches.

T-slot guide ways are provided at the front of the column,

in which are arranged two adjustable V-blocks for securing the billets. In addition, two other fixtures are carried in the slotted ways, the top fixture having a locating bush for the drill, while the bottom fixture takes the thrust.

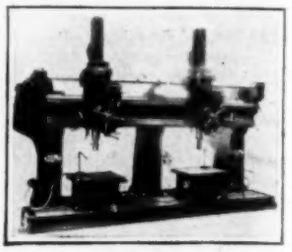
Overall height 10 ft.; floor space 5 ft. 4 in. x 2 ft. 6 in.; weight 3,700 pounds.

— 22 —

Drilling Machine, Locomotive Connecting-Rod

Kitchen & Wade, Halifax, England. [Vol.68,p.109E]

This machine was built for drilling and boring locomotive connecting and coupling rods. It drills 4-in. holes in solid steel



and will bore holes up to 12 in. diam. Each head is driven independently by a 10-hp. motor through a nine-speed gearbox. Ball bearings are used wherever possible.

The two worktables can be quickly adjusted to suit the work at hand. The tops of the 30x30-in. worktables have T-slots and a central hole for taking boring bars. The spindles are bored No. 5 Morse taper and have a vertical traverse of 15 in. The maximum and minimum centers of the spindles are 11 ft. and 1 ft. 10 in., respectively, while the maximum distance from spindle nose to the top of table is 1 ft. 9 in. The nine spindle speeds range from 240 to 22 r.p.m., and the nine feeds from 160 to 25 cuts per inch.

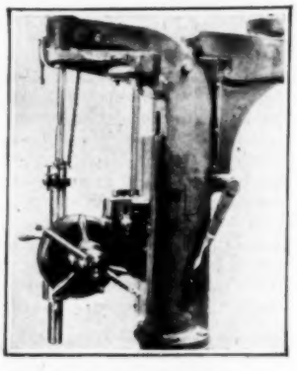
Weight of the machine 11½ tons.

— 23 —

Automatic Feed Mechanism for Drills

Jones & Shipman, Ltd., Leicester, England. [Vol.68,p.128E]

An automatic feed mechanism is now available for this company's 18-in. super-power single- and multiple-spindle drills. The principal features of the mechanism are that a wormwheel of ample size runs in an oil bath



with three rates of automatic feed operated by sliding gears, dispensing with dive keys, and having a chain drive. Engagement of the sliding gears is effected by means of the firm's standard inclosed feed mechanism.

A stop clipped on the quill automatically knocks out at any required depth. The automatic feed mechanism is chain driven from the main spindle. The feed rates are 176, 240 and 333 rev. per inch.

Grinding Machines

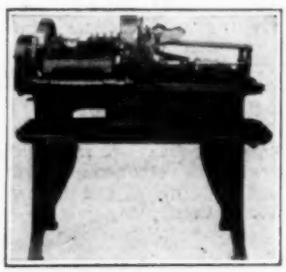
— 24 —

Grinder, Centerless, for Twist Drills

Harry F. Atkins, Peterborough, England. [Vol.67,p.300E]

This centerless grinder is designed for small twist drills. The work is ground on the face of the grinding wheel, and the drill is traversed in one direction by the action of the grinding wheel. A mechanically-actuated finger is used to traverse the drill in the opposite direction.

The drill is traversed about six times across the wheel in



both directions. The pusher plate that keeps the drill up to the wheel is then raised automatically (allowing the ground drill to fall down a chute) and takes a new drill for grinding from the magazine into which six to eight drill blanks are fed by hand.

The drill is ground slightly larger at its cutting end by utilizing the extra velocity and, therefore, grinding power of the outer diameter of the wheel face, and by careful regulation of the length of traverse and the rate of feed to this extra grinding power.

The principle used in this machine is applicable to centerless grinding of all kinds, though in most cases the periphery of the wheel would be used. For shoulder work it is claimed to be far ahead of the pass-through principle generally employed.

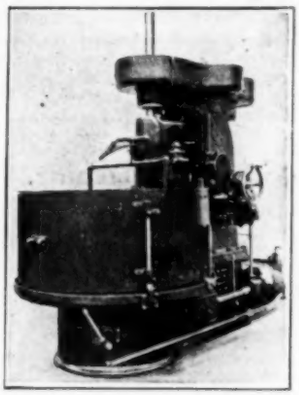
— 25 —

Grinder, Surface, Vertical-Spindle

Churchill Machine Tool Co., Ltd., Manchester, England. [Vol.67,p.204E]

The 24-in. grinding wheel of this rotary-table type surface grinder is carried on a vertical spindle. The table is 62 in. in diam., can be started and stopped from either side of the machine or from the front, and has three speeds. A special sizing indicator is secured on a T-slotted slide inside the table guards. Thus the amount of metal removed can be seen, the indicator showing when the work has been brought to dimension. When loading or unloading the table, the gage can be swung out of the way.

The wheel spindle runs in roller bearings with ball thrusts.



The pulley for driving the spindle is carried on a roller bearing sleeve, thus removing all belt pull from the spindle. There are four spindle speeds. Quick release is obtained by means of a dropping worm, and automatic trip motion is provided to operate at any desired point.

— 26 —

Grinder, Surface, Vertical-Spindle

Alfred Herbert, Ltd., Coventry, England. [Vol.67,p.286E]

This grinder, made by Lumsden Machine Co., Ltd., Gateshead, England, and marketed by the above firm, is for small work that can be grouped on the table for grinding in large quantities at a time. It is of vertical-spindle type, direct motor drive, and is self-contained.

The rotating table is driven by a separate motor mounted on an extension of the base and is provided with fast and slow table speeds of 12 and 3 r.p.m. respectively.

The wheel spindle is carried in a cylindrical ram having a vertical adjustment of 6¼ in. Ten rates of feed range from 0.003 to 0.03 in. per min. The

grinding wheel is of the Norton segmental type and its diameter is 12½ inches.

Maximum height under wheel 9½ in.; floor space 7x7½ feet.

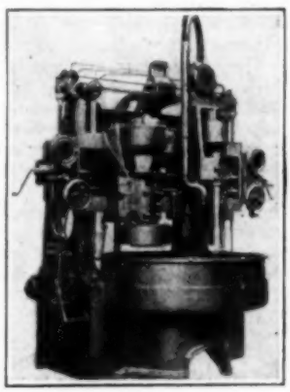
— 27 —

Grinding Machine, Surface and Internal

Smith & Coventry, Ltd., Timperley, Manchester, England. [Vol.68,p.31E]

This machine, while specially designed for grinding laminations in stator cases, is also suitable for general work in surface grinding. The table is 4 ft. 9 in. in diam., swinging work up to 5 ft. 3 in. diam. The maximum diam. of the hole that can be ground is 3 ft., the minimum with standard snout being 7 in. in diam., though a smaller snout is available for smaller holes. The maximum depth of hole ground is 24 inches.

The table is mounted on a bed which carries uprights for the crossrail, this again carrying the internal and surface grinding heads and having power motion vertically. The internal head is driven direct by



an independent 2-hp. motor, the standard grinding wheel being 6 in. in diam. by 1 in. wide and running at speeds between 2,300 and 4,000 r.p.m. The table speeds are from 6 to 60 r.p.m. and the feeds per rev. are ½, ¾ and 1 in. The spindle has power vertical traverse. A micrometer adjustment for setting the depth of cut is provided.

The surfacing head has hand cross adjustment. The depth of cut is set by handwheel.

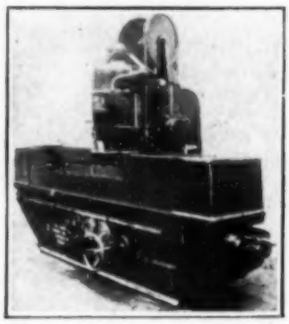
Floor space 8 ft. 6 in. by 11 ft.; weight 7½ tons.

— 28 —

Grinding Machine, Surface, Vertical-Spindle

Churchill Machine Tool Co., Ltd., Broadheath, Manchester, England. [Vol.68,p.101E]

This vertical-spindle surface grinding machine is of the traveling-table type, longitudinal



traverse being effected hydraulically. Any length of traverse up to 96 in. can be obtained.

The table can also be run past the reversing lever without disturbing the setting of the dogs so that the wheel may be clear of the work for inspection, removal, or reloading. An infintely variable speed of traverse may be obtained from 1 to 30 ft. per minute.

The 24-in. segmental grinding wheel spindle is direct driven by a 40-hp. motor. With a Churchill belt drive a 60-hp. motor can be employed on the same wheel.

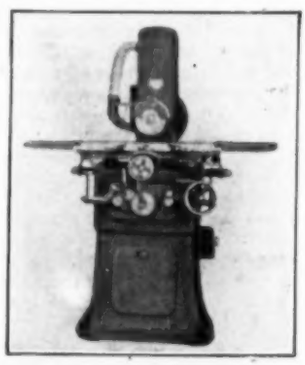
The machine is available in two sizes having tables with working surfaces respectively of 84x22 in. and 96x22 in. The smaller machine occupies a floor space of 25x7½ ft. and weighs 11 tons, while the larger machine occupies a floor space of 27x7½ ft., and weighs 12 tons.

— 29 —

Grinder, Surface, Hydraulically-Operated

Dowdings' Machine Tool Co., Ltd., Vauxhall, S.E., London, England. [Vol.68,p.121E]

The firm of Karl Jung, Berlin, Germany, produces this surface grinder in which hydraulic gear is used both for the longitudinal travel of the table and for applying the transverse feed. The speed of the table can be



regulated between 0 and 16½ ft. per min. so that it is possible to rough out and finish to the desired accuracy at one setting.

The machine is made in two sizes, the larger having a table with a working surface of

24x6¾ in. to grind lengths up to 24 in., the maximum distance from the table to the center of the wheel being 13 in. The smaller machine has a table with a working surface of 12x6¾ in. to grind up to 12 in. long, the maximum distance from the table to the center of the wheel being 10½ inches.

In each machine, the transverse feed of the table is 7 in., the longest grinding wheel is 7 in. in diam. x ⅝ in. wide, and the automatic transverse feed of the table is from 0.005 to 0.007 in. The spindle runs at 2,800 rev. per minute.

— 30 —

Grinder, Tool and Cutter

A. C. Wickman, Ltd., Charterhouse Works, Coventry, England. [Vol.68,p.58E]

Besides sharpening all ordinary tools and milling cutters within its capacity, this grinder, with the attachments available, can also be used to a certain extent for cylindrical, internal, and surface grinding. The

a.c. motor gives two spindle speeds, 3,350, and 6,700 r.p.m., respectively. The motor is mounted vertically within the base. A constant-speed pulley may be used, however, belted directly to the line shaft.

The grinding wheel head has a swiveling adjustment through a complete circle and can be locked in any position. Table and saddle are arranged to give the movements of a compound slide. The table swivels about a fixed center on the table slide.

The work spindle head has an indexing attachment to index any number which can be divided into 24. For cylindrical and internal grinding, a special workhead with a ¼-hp. motor is supplied. It drives the work spindle at three speeds, changes being obtained by change gears. A surface grinding and gear cutter grinding attachment is also available.

The height of centers of the machine is 5 in. The maximum distance between centers is 16½ in., the cross travel of the table 10 in., and the vertical adjustment 9 inches.

— 31 —

Hob Sharpening Machine

Dowding & Dickinson, Westminster, S.W., London, England. [Vol.68,p.124E]

The firm of Hermann Pfauter, Chemnitz, Germany, produces this hob sharpening machine in two types, semi-automatic and fully-automatic. The maximum automatic movement of the table is 13¼ inches.

The semi-automatic machine has automatic table travel with positive rotation of the cutter according to the spiral grinding flute, the latter being governed by a change gear system. The indexing from flute to flute is by hand through an index plunger and plate. Adjustment of the work to the wheel, both on setting-up and after each stroke of the table, is also effected by hand.

With the automatic machine, the indexing from flute to flute and the feed after a complete revolution of the work are self-acting. Indexing takes place after every forward and return stroke and the point of indexing can be adjusted to suit the cutter being sharpened. The feed per revolution of the cutter is also adjustable.

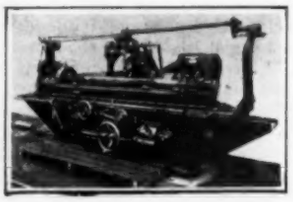
These machines are specially designed for sharpening hobs, but form cutters and reamers may be dealt with. In hob cutters, all spiral-fluted milling cutters up to 6¼ in. diam. and up to 10¾ in. long can be dealt with, the maximum grinding length varying, however, according to the wheel diameter and the shape and depth of flute.

— 32 —

Grinder, Railway Axle

Churchill Machine Tool Co., Ltd., Broadheath, England. [Vol. 67,p.311E]

The grinding of journals and wheel seats on locomotive, carriage, and wagon axles is the work of this machine. It swings 16 in. over the table and is made with beds of five lengths to take



work from 6 to 10 ft. between centers. The grinding wheel is usually 20 in. in diam. by 3 in. wide. Two wheel speeds are provided, eight work speeds and sixteen table speeds.

A mirror attachment gives the operator direct control of the wheel attachment in making contact with the work. Also, an indicator shows the position of the wheelhead on its slide. Quick hand motion is provided for the wheelhead.

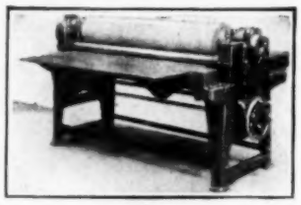
Ratchet wheel feeds operate at each reversal of the table, giving a reduction in diameter of from 0.00025 to 0.004 in. The table can be set to grind tapers up to included angles of 7 or 9 deg. A special positioning device is provided to allow for possible differences in center depth at the ends of the axle.

— 33 —

Grinding Machine, Burr

Smith & Conventry, Ltd., Timperley, England. [Vol.68, p.6E]

This machine grinds burrs and flashes from thin metal punchings as used in connection with electrical machinery. The wheel illustrated is 54 in. wide, built up in three sections of carborundum. The maximum width of work is 54 in., and the smallest convenient width 14 in. The working speed is 30 ft. per min. A 30-in. machine is also available.



The grinding wheel in the illustration is 11 in. in diam., and can be used down to a diameter of 7 in., the speed with a new wheel being 1,400 r.p.m. The 30-in. machine carries a 6-in. wheel running at a speed of 2,250 r.p.m., and can be used down to 4 in. in diam. A truing device is provided.

Allowance is made for varying thickness in the material drawn through. Provision is made to prevent injury should a thick plate be passed through. The larger machine requires a 6-hp. motor and the smaller machine a 3-hp. motor.

Overall dimensions of the larger machine 87x59x44 in.; weight 3,500 pounds.

— 34 —

Grinder, Roll, Automatic, Improved

Naxos-Union, Frankfurt, Germany. [Vol.68,p.97E]

This improved automatic roll grinding machine will grind work 39½ in. in diam. maximum.

Beds are available to take up to 32 ft. 10 in. between centers, the maximum weight of work admitted being 10 tons, or if supported by work steadies, 20 tons. Five motors are required for driving; a 6-10-hp. work motor, a 25-30-hp. wheel motor, a 3-hp. grinding carriage motor, a 75-hp. reversing motor for the quick traverse of the grinding head, and a motor for driving the centrifugal pump used for wet grinding.

The eight work speeds range from 4 to 43 r.p.m. The work is held between dead centers and is supported by steadies of heavy type.

The reciprocating feeds are in nine rates, from 4¾ to 79 in. per min. The grinding head is adjustable transversely on the carriage, with rapid and fine feeds by hand. In addition, the power cross-feed, acting either at each or every second longitudinal traverse of the carriage, has a range of from 0.00005 in. to 0.002 in. per stroke.

The grinding wheel has three speeds which range from 550 to 800 r.p.m. The maximum reduction of work at one setting is 0.032 inches.

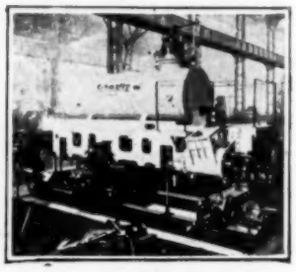
— 35 —

Grinding Machines for Locomotive Frames and Boilers

United Machine Tool Co., Ltd., Holborn Hall, London, W. C., England. [Vol.68,p. 134E]

Friedrich Schmaltz, G.m.b.H., Offenbach-on-Main, Germany, produces the three grinding machines shown in position at work on the frame and boiler of a locomotive. These machines include a double-acting hornblock grinder and grinders for steam dome joints and cylinder cover joints respectively.

The hornblock machine employs cup wheels covering the



total height and width of the cheeks. All the cheeks, whether vertical or inclined, are ground parallel, thus enabling distorted frames to be rectified. The machine itself is stationary and the underframe is adjusted upon it. The machine consists of the main bed about 46 ft. long, resting on the floor. This bed carries the frame supports, and one or two grinding saddles. Three frame supports are car-

ried on both sides. Each support is adjustable in three directions, so that the frame can be set in height, and longitudinally corresponding to the cylinder axis. The standard machine has one grinding saddle carrying the two grinding heads which have independent transverse power traverse.

On top of the boiler will be seen a Schmaltz portable dome joint grinder. This can be used to grind both the boiler face and also the dome ring, while badly pitted dome joints can in addition be turned.

The cylinder cover joint grinder is similar to the steam dome joint machine except as regards the method of centering. It grinds with a cup wheel, the joint produced being at right angles to the cylinder axis.

Lathes

— 36 —

Lathe, Engine, Quadruple-Geared

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchester, England. [Vol.67,p.205E]

The illustration shows the back view of this heavy, compound lathe. It has two carriages, and the front rest is arranged for cutting screws and tapers. A quick traverse by

separate motor is provided for the saddle along the bed.

The height of center is 40 in., the swing over the saddles is 66½ in., and the faceplate is 6 ft. in diam. The length of the bed is 28 ft. The drive is by 30-hp. motor. Twenty-four speed ranges are provided ranging from ¼ to 30 r.p.m. The front and rear saddles are independent of each other. All motions are interlocked, and the saddles can be moved along the bed either by power or by hand.

The quick power traverse is obtained from a 9-hp. motor. The longitudinal feeds range from 1/16 to ½ in. per rev., and the cross-feeds from 1/32 to ¼ in. per revolution.

Weight 33 tons.

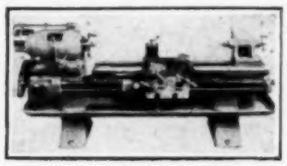
— 37 —

Lathe, Engine, All-Geared Head, 17-Inch

Colchester Lathe Co., Hythe, Colchester, England. [Vol.67, p.231E]

This 8½-in. center all-geared head lathe is made with two beds 8 and 10 ft. long, each lathe swinging 17 in. diam. over the bed or 12 in. over the saddle and admitting in the gap work 28 in. in diam. x 8 in. wide. The 8-ft. bed machine takes work 4 ft. 9 in. between centers and the 10-ft. bed, 6 ft. 9 in. between centers.

The headstock, saddle and gearbox mechanisms are arranged to prevent conflicting motions. The headstock gives eight speeds ranging from 15 to



255 r.p.m. in geometrical progression. The spindle is bored 2 1/16 in. to take a 2-in. rough bar. The saddle is T-slotted, offering a planed flat surface on which work can be bolted when the slide rest has been removed. The slide rest can be swivelled to any required angle.

The leadscrew is used for screw cutting only. The quick-change gearbox provides 24 thread pitches from 3½ to 48 per in., and 24 feeds from 10 to 144 cuts per in. Provision is made for turning tapers.

With the 8 ft. bed the machine weighs about 2,400 pounds.

— 38 —

Lathe, General-Purpose and Wheel

Stanley Machine Tool Co., Ltd., Halifax, England. [Vol. 67,p.270E]

The box-section bed of this machine is 17 ft. long x 20 in. across the top, and 14 in. deep. Besides the usual half-gap piece it has a second removable gap piece, the latter gap being in such a position that the lathe will accommodate wheels from 24- to 36-in. gage, and swing up to 3 ft. 6 in. in diam. in the gaps.

The headstock gives eighteen spindle speeds ranging from 5 to 300 r.p.m. The spindle bearings are of the adjustable conical type, with a ball thrust bearing. The steel spindle has a 4-in. hole for bar work. The screw cutting motion is operated by change wheels at the end of the bed, and eight feeds are provided, varying from 8 to 100 cuts per inch.

A feature is the taper-turning attachment used for wheel treads and also for turning taper threads on pipes. It is carried at the back of the saddle on a bracket and can be brought into use when needed.

Weight about 5½ tons.

— 39 —

Lathe, Engine, 30-Inch

Denham's Engineering Co., Ltd., Halifax, England. [Vol. 68,p.61E]

Work 10 ft. long between centers, 30 in. in diam. over the bed, and 22½ in. over the saddle, may be taken by this all-geared engine lathe with direct motor drive. Work up to 4 ft. 4 in. diam. x 20 in. wide can be machined in the gap. The bed is 18 ft. long x 2 ft. 2 in. wide

across the shears. The twelve spindle speeds range from 4 to 133 rev. per minute.

The spindle has a 6½-in. hole for bar work. The end thrust is taken on a ball thrust bearing, and a bell chuck is mounted on the rear end for steadying long work. The headstock gears and shafts are of hardened crucible steel. The drive is by 20-hp. motor mounted on a pedestal and direct coupled. Provision is made for turning tapers.

The saddle has quick hand traverse along the bed. Six positive feeds from 8 to 192 cuts per in. are provided. The lead screw is used for screw cutting only, its guaranteed total pitch error not exceeding 0.006 in. in any length of 6 ft. A thread-indicating dial is fitted.

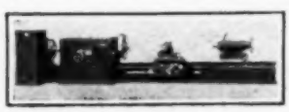
Floor space 20 ft. 8 in. x 6 ft. 6 in.; weight 10 tons.

— 40 —

Lathe, Engine, High-Speed, 32-Inch

Schiess-Defries A. G. Dusseldorf, Germany. [Vol.68,p.122E]

A 35-hp. motor drives this machine. It has 16 in. height of centers and takes about 13 ft. between centers. It is suitable for producing both rough and finished work. Spindle speeds range from 20 to 600 r.p.m.



Roller bearings are used for the main spindle. The back center can rotate, being mounted on ball bearings.

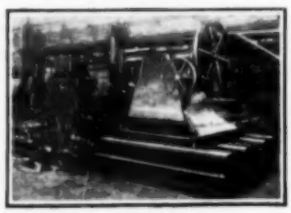
Feeds are available in six rates from 6 to 90 cuts per in. The machine can be completely controlled from the saddle by push buttons. For quick travel along the bed the saddle bears a 3-hp. motor, also controlled by push buttons. All controls, speed indicators, etc., are placed conveniently for the operator.

— 41 —

Motor Drive for Lathe Saddle

Armstrong, Whitworth & Co., Ltd., Openshaw, Manchster, England. [Vol.67,p.313E]

The 51-in. center lathe illustrated is similar to the 40-in. quadruple-geared lathe described on page 203E, Vol. 67, of the *American Machinist*. However, in this machine an electric motor is bolted direct to the saddle,



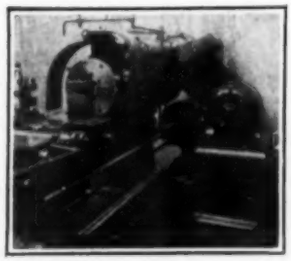
thus enabling a quick run along the bed in a direct manner. Several advantages result from this arrangement for many types of work. This motor drive can be supplied with lathes of practically any size up to 51-in. centers.

— 42 —

Lathe, Turret, Combination No. 9, with Self-Contained Motor Drive

Alfred Herbert, Ltd., Coventry, England. [Vol.67,p.231E]

The No. 9 combination turret lathe can now be obtained with a self-contained motor driving through a silent chain. The



motor is carried on a special base attached to the back of the lathe, and the chain runs in a

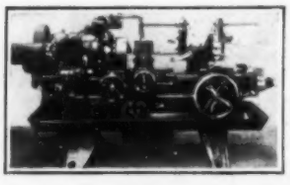
totally inclosed case. The motor has a slight amount of adjustment on the base to take up chain slack, and is of the constant-speed non-reversible type, all speed changes and reverse being obtained in the headstock.

— 43 —

Turret Lathe, Combination, Improved

Selson Engineering Co., Ltd., Charles St., London, E. C., England. [Vol.68,p.95E]

Gebr. Heinemann, St. Georgen, Germany, produces this combination turret lathe. Height of centers is 8 in., the maximum diameter admitted through the automatic chuck, when used,



being $2\frac{3}{8}$ in. or $2\frac{1}{2}$ in. through the spindle. It will swing work 18 in. in diam., or 12 in. over the cross-slide, the maximum length bored being 10 in. and the maximum distance between the chuck and the turret face 34 inches.

Ten speeds are available in each direction. All gears are hardened and the spindles run in ball bearings. The main spindle is hardened and ground and its journals are lapped. Thrust is taken on ball bearings. The cross-slide has tools at the back and front, and is of the full-swing type. Twelve reversible longitudinal and cross feeds are obtained.

A full range of right- and left-hand Whitworth threads can be cut. Six turning tools can be used on the head. Twelve independent feeds are provided for the turret slide.

Weight about 2 tons.

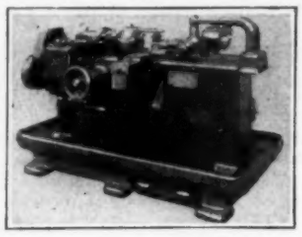
— 44 —

Turret Lathe, Automatic

B. S. A. Tools, Ltd., Birmingham, England. [Vol.68,p.184E]

The manufacture of flywheels, end shields, couplings, and flanges from steel forgings and castings is the work for which this machine has been designed. It is fully automatic except for the chucking of the work. The maximum swing is $10\frac{1}{4}$ in. with the cross-slide out of the way, or $7\frac{1}{2}$ in. with full stroke of the cross-slide.

The maximum travel of the capstan slide is $7\frac{1}{2}$ in., with a minimum travel of $1\frac{1}{2}$ in. to revolve the capstan, the length of the working stroke being 6 in. and the maximum length of



cut 5 in. The ten spindle speeds range from 35 to 264 r.p.m., and the twelve feeds from 0.005 to 0.050 in. per rev. Seven horsepower is required for driving.

The spindle has a $2\frac{1}{4}$ in. hole and carries a 9-in. chuck. The maximum distance from the flange of the spindle to the face of the capstan is $22\frac{1}{2}$ in., and the minimum distance $11\frac{1}{2}$ inches.

Front and rear cross-slides are provided for forming and cutting off. The travel of each cross-slide is $3\frac{1}{4}$ in. A coolant pump is provided.

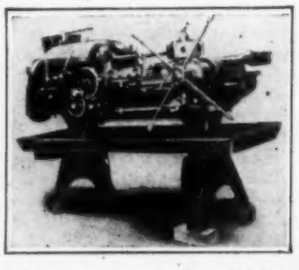
Floor space 6 ft. 9 in. by 3 ft. 6 in.; weight 4,500 pounds.

— 45 —

Lathe, Capstan, with Pivoting Leg

Alfred Herbert, Ltd., Coventry, England. [Vol.68,p.187E]

This machine is designed to remain in accurate alignment in any condition of uneven foundation. The right-hand leg is attached in such a manner that it



is free to accommodate itself to any unevenness of the foundation.

When the machine is installed, a set screw on the front of the pivoting leg is slackened when the machine has been placed in position. This will free the bed from any cross wind. Under the test shown in the illustration, the pivoting leg being mounted on two bricks, two dial indicators gave the same reading when the machine was mounted on the bricks as when in natural position.

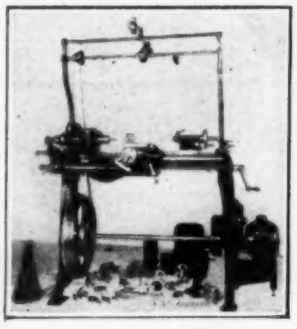
— 46 —

Lathe, Combination, with Electric Drive

Henry Milnes, Bradford, England. [Vol.68,p.7E]

The particular field for this combination lathe is the manufacture and upkeep of scientific instruments, and experimental work. The height of centers is 4 in. and the 4-ft. bed will admit work 2 ft. 3 in. between centers while 1 ft. 2 in. diam. can be swung in the gap. The hollow spindle will pass bars $\frac{3}{4}$ in. in diam. and has ten speeds.

Feeds from the coarsest to 600 per in. may be obtained. The headstock carries provision



for dividing. The spindle is fitted with self-centering and independent chucks, and draw-in bar and split-collet chucks. The tailstock is provided with means for measuring the depth of drilled hole. The saddle screw is fitted with micrometer collar.

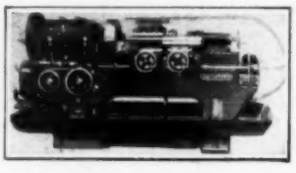
— 47 —

Lathe, Multi-Tool

Selson Engineering Co., Ltd., Charles St., London, E. C., England. [Vol.68,p.136E]

Gebr. Heinemann, A.G., St. Georgen, Germany, produces this lathe in two sizes with $6\frac{3}{4}$ and $7\frac{1}{8}$ in. height of centers, the larger to swing work $12\frac{1}{2}$ in. in diam. over the carriage, and available with beds of a number of lengths to take up to 4 ft. between centers. Eight spindle speeds are provided. The spindle is bored $1\frac{3}{8}$ inches.

The motor may be from 6 to



15 hp., according to the type of work. Rapid motion is provided for both carriages. For repetition work, the rapid return of the two carriages may be put into operation automatically. Taper and spherical turning attachments can be added. The front carriage is for turning, the rear slide for facing, but can be used also for turning. Thirty-two feeds are provided, ranging from 0.002 to 0.1 in. per revolution.

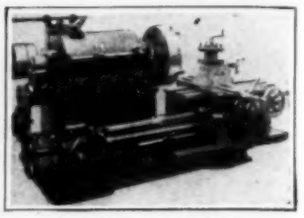
— 48 —

Lathe, Surfacing, 36-Inch

Graham & Normanton, Halifax, England. [Vol.68,p.175E]

The extreme distance between the chuck face and the slide of this machine is 22 in., work 3 ft. in diam. being admitted in the gap. The bed is 7 ft. long by 21 in. wide, and is provided with an outer support for the saddle in the form of a rail at the front. The spindle has a $3\frac{1}{8}$-in. hole for bar work.

The eighteen spindle speeds range from 9 to 461 r.p.m. End thrust is taken on balls. The



lead screw is friction-geared and has automatic interlock.

Provision is made for turning tapers. All standard threads from 1 to 48 per in., and any feed from 12 to 144 cuts per in. can be obtained by means of the gearbox and four additional change gears. The machine can be arranged for motor drive.

Weight as illustrated, 4,400 pounds.

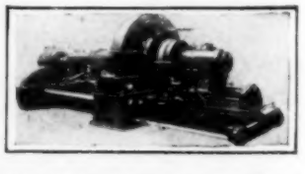
— 49 —

Lathe, Wheel, Center-Driven, Pneumatically-Controlled

Noble & Lund, Ltd., Gateshead, England. [Vol.67,p.265E]

Railway carriage wheels of any type, mounted on their axles, can be rough-turned and profiled in this machine. The wheels are raised to the central position, the tailstocks brought into position and clamped, and the tools clamped pneumatically.

The outside journals of the axle are carried inside the tailstock spindles by means of split taper bushings which are strapped to the axles before the wheels are run into the lathe.



Two 50-in. faceplates are provided on the driving spindle, each having three adjustable drivers. Inside the tailstock spindles internal steel spindles are fitted. Each is adjustable endwise for gripping the axle journals by the aforementioned bushings.

The main drive wheel is driven by means of two idler pinions, one of the two always being in mesh with the main gear, and there is no need for segmental blocks in the gaps of the wheel. A 50-hp. motor drives the machine. The spindle

speeds are 0.7 to 2.7 r.p.m. and four feeds are available. The machine is intended for wheels from 30 to 48 in. in diam. and can accommodate wheels of either 5 ft. 6 in. gage or 4 ft. 8½ in. gage.

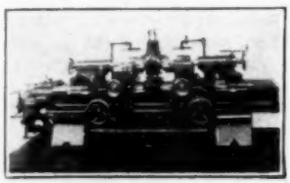
Weight, 32 tons.

— 50 —

Lathes, Crankshaft

Armstrong, Whitworth & Co., Ltd., Manchester, England. [Vol.68,p.185E]

Two machines with central drives for turning both ends of a four-throw crankshaft at the same time are available. The machine illustrated is for turning down the two ends, facing down the outside web of the



crankshaft, turning the tops of the throws, and turning the center bearing. The other machine is arranged to turn the pins of the crankshaft and face the webs in three operations.

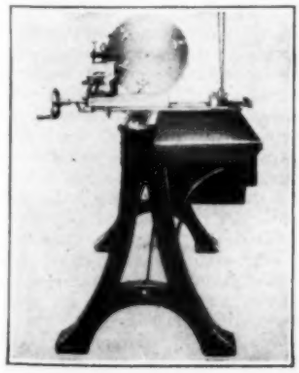
The machines are similar in construction, having a driving gearbox cast as part of the bed. The gearbox gives six speed changes. The feedbox is fixed on the front of the gearbox and gives four changes of feed for turning, and four for facing. The driving head is mounted in the center of the bed and is 8 in. wide.

— 51 —

Lathe for Phonograph Record Matrices

G. Karger, 52 Krautstrasse, Berlin, Germany. [Vol.68,p.188E]

This precision lathe is designed for turning wax matrices for phonograph records. A feature is the fine thread of the screw for the saddle, the pitch of which is about $\frac{1}{48}$ in.



The drive for the screw is without gears, and the cut produces a surface which has the appearance of being polished.

The rim of the matrix can also be turned, as well as the running-on spirals. The height of centers is 8⅞ in., and the length of bed 39⅜ in. The headstock is of the plain, ungeared type, having a four-speed cone pulley. The forward transverse feed of the saddle slide is varied by cone pulley, ranging from 4.37 to 14.4 in. per min., with quick returns at twice the speed.

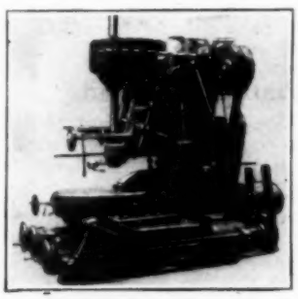
Milling Machines

— 52 —

Milling Machine, Vertical

Alfred Herbert, Ltd., Coventry, England. [Vol.68,p.176E]

The longitudinal feed for this vertical milling machine is 62 in., and the transverse feed 38 in. The maximum distance from the table to the spindle is 28½ in., the distance from the center of the spindle to the face of the column 26½ in., and the vertical adjustment of the spindle head 21 in. The working surface of the table is 85x19 in. A special, large saddle and table can be sup-



plied, also an extra large circular table.

Sixteen spindle speeds ranging from 12 to 360 r.p.m. are provided. The sixteen feeds range from 1½ to 26¾ in. per minute.

Sectional tables are available to fit one on each side of the circular table. A rotating square table can be attached either centrally or offset, as well as various other attachments.

The standard machine occupies a floor space 11 ft. 3 in. by 13 ft. 3 in.

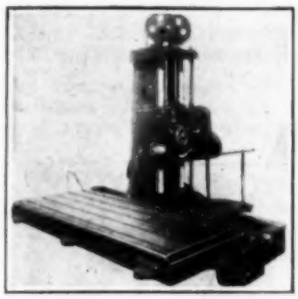
Weight, 18,000 pounds.

— 53 —

Miller, Horizontal and Vertical

Hulse & Co., Ltd., Salford, Manchester, England. [Vol.67, p.287E]

These machines are used for milling, by means of built-up face cutters, the joint faces of transformer tanks and their cast-iron covers. The machine illustrated has a 3-in. spindle and will cover an area 3 ft. vertically by 8 ft. 6 in. horizontally, the horizontal adjustment of the spindle itself being 8 in. The frame which carries the spindle is adjustable to any desired position along a slide bed which is 13 ft. long by 3 ft. wide.



The work plate is 9 ft. 6 in. long by 4 ft. wide. The distance from the center of the spindle to the top of the work table is 4 ft. maximum, and 12 in. minimum. The main drive is through double helical gears by a 7½-hp. motor having a feed variation of three to one. The spindle speeds range from 25 to 75 r.p.m. Variable reversible power feed motion is available for the spindle slide vertically and for the upright frame horizontally.

The spindle feeds range from 2½ to 15 in. per minute.

— 54 —

Milling Machine, Plain, Universal, and Vertical

A. C. Wickman, Ltd., Coventry, England. [Vol.68,p.71E]

Wanderer - Werke, Schonau, near Chemnitz, Germany, produce these milling machines in plain, universal, and vertical type. The spindle is 3$\frac{9}{16}$ in. in diam., and has twelve speeds ranging from 18 to 450 rev. per minute.

All three types of machines have tables with working surfaces 59x13¾ in. In the plain and vertical type, the horizontal power traverse of the table is 39x10¾ in. transverse, and 17¾ vertical. The corresponding movements in the universal machine are 33x10x16½ in. The vertical machine has, in addition, a vertical adjustment for the spindle head of 3½ inches.

In each case, sixteen auto-

matic feeds are available, the range in the longitudinal direction being $\frac{3}{8}$ to 19¾ in. per min., while the longitudinal travel of the table is at the rate of 82 in. per min., half these rates applying to the transverse motion and one-third to the vertical travel.

The milling table of the universal machine swivels 50 deg. in each direction. The milling table of all three types has automatic quick traverse for all slides, longitudinal, cross, and vertical. The universal milling machine is not supplied with intermittent feed, but sixteen feeds are provided for the table.

Weight of plain machine is 6,160 lb. and of the universal and vertical machines, 6,325 pounds.

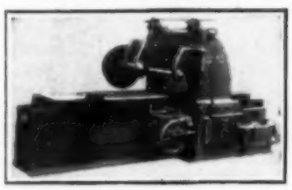
— 55 —

Milling Machines, Planer-Type, for Railway Work

Hulse & Co., Ltd., Salford, Manchester, England. [Vol.67, p.294E]

Besides the type illustrated, these machines are supplied with one removable side-upright, and in a two-spindle vertical type.

The plain type is intended for use in locomotive shops for machining axle-boxes, liners, slide valves, eccentric sheaves,



and side rods. It will mill 8 ft. in length and admits work 2 ft. 1 in. between uprights. The maximum diam. of the cutter admitted is 7½ in. In this machine the bed is 12 ft. long by 18 in. wide. The table is 8 ft. by 19 in. over the planed part.

The eight spindle speeds range from 15 to 60 r.p.m. There are eight power feeds to the table, from $\frac{3}{8}$ to 6½ in. per minute.

Weight, 5½ tons.

The motor-driven horizontal planer - type milling machine with removable upright at the side is intended for dealing with

suspension details for carriages and other general work. It will mill 4 ft. by 2 ft. 5 in. The bed is 5 ft. 6 in. by 18 in., and the table is 5 ft. 10 in. by 2 ft. 5 in. over the planed part. The spindle slide is adjustable vertically by screw. The spindle has a transverse adjustment of 4 in. for setting. Three rates of feed are provided, 1, 2, and 3 in. per minute.

Weight 4½ tons.

The two-spindle vertical milling machine is supplied for railway carriage work. It has been designed for milling at one operation two sides of a buffer shank. This machine also, is of the planer type to mill 4 ft. in length. The bed is 6 ft. by 18 in., the table being 4 ft. 9 in. by 15 in. over the plain part and 5 ft. 10½ in. by 23 in. overall. The two spindle slides are independently adjustable along the cross-slide by hand. Spindle speeds range from 20 to 80 r.p.m. The four rates of feed offered range from 1 to 4 in. per min. A self disengaging motion can operate at any part of the table traverse, while reversible quick power traverse to the table is also supplied.

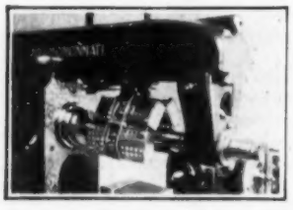
Weight 4½ tons.

— 56 —

Guard, Milling Cutter

J. Broughton, Vere St., Birmingham, England. [Vol.68, p.30E]

This guard has been modified to suit overarms of the Cincinnati type. Two bracket pieces are used to clip the inclined surfaces of the arm, being drawn



tight for that purpose by means of a cross-bolt. Thus the guard can be slid horizontally to any position desired.

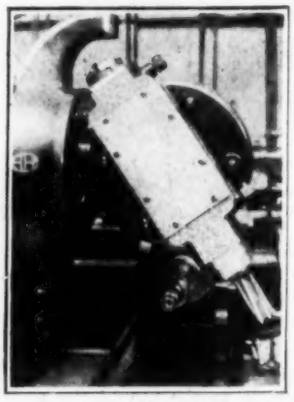
The guard can be built up of standard interchangeable sections, the numbers of which vary according to the dimensions of the cutter to be guarded. The firm also supply their milling cutter guard with special fittings for attachment to milling machines without overarms.

— 57 —

Milling Attachment, Universal

Alfred Herbert, Ltd., Coventry, England. [Vol.68,p.263E]

The above company has greatly increased, by means of the universal attachment here



illustrated, the scope of its plain and universal milling machines. On plain mills it enables vertical and angular milling to be done, and on universal mills it provides, in addition, for the cutting of racks and spirals of short lead. The attachment is bolted directly to the column.

The spindle has swiveling motions in two planes, thus allowing a great deal of angular milling to be done with plain cutters instead of employing a large number of angular cutters. The spindle has a B & S taper hole with box clutch drive and drawbolt.

For spirals of short lead, the table feed screw is connected directly to the spindle of the dividing head by change gears instead of through the worm gear in the usual way, in order to avoid excessive gearing.

Planers and Shapers

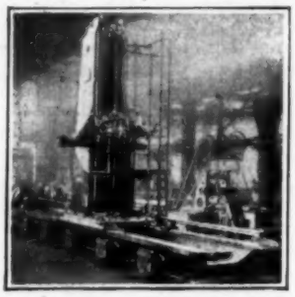
— 58 —

Planing Machine, Vertical and Horizontal, Large Size

J. Buckton & Co., Ltd., Leeds, England. [Vol.67,p.206E]

The exceptional size and capacity of this vertical and horizontal planing machine is shown by the fact that the maximum strokes are 24 ft. horizontal and 10 ft. vertical. The machine is intended for finishing Diesel engine castings carried on work tables bolted up to the bed of the planer, six seatings being provided for this purpose.

The tool ram has a horizontal range of 2½ ft. in the saddle, and carries a double-cutting tool-holder. The vertical and horizontal speeds are from 17 to 68 ft. per min. By means of



a sliding gear, the drive can be transferred from the horizontal screw that actuates the column, to the vertical screw that actuates the saddle on the column. For planing horizontally, the vertical screw is locked and the vertical feed to the saddle is obtained by rotating the nut. When planing vertically, the horizontal screw is locked, rotation of its nut providing the horizontal feed to the column.

Horizontal cross-feeds can be obtained up to 2½ ft. The floor space (without worktables) is 50x10 ft., and the total height to top of column is 19 ft. 9 in.

Approximate weight, including the electrical equipment, but not the worktables, 48 tons.

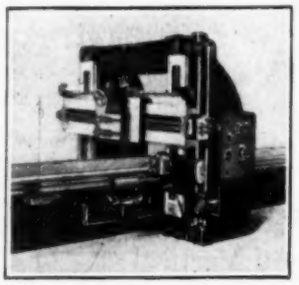
— 59 —

Planer, Roughing

Soag Machine Tools, Ltd., Horseferry Road, Westminster, S.W., England. [Vol.68,p.70E]

The illustration shows a roughing planer, by H. A. Waldrich, G.m.b.H., Siegen, Germany. The machine has only one tool box on the cross-rail, but is provided with one or two side tool boxes. The cross-rail box carries two tools, for rough cutting and rough finishing. The drive is effected by two reversing d.c. electric motors.

The standards of the planer are especially heavy, and are extended backwards and connected by a heavy top beam. In addition to the usual front



guides, the cross rail has a back structure with guides at the rear. The crossrail is locked to both front and rear guides on the housing, the standards, crossrail and top beam forming a complete structure. The locking of the crossrail on the standards is done from a central position by hand, or it can be effected by means of a small motor. A further feature is a slotting device.

The planer is arranged for cutting speeds of from 26 to 90 ft. per min. and for a return speed of 100 ft. per minute.

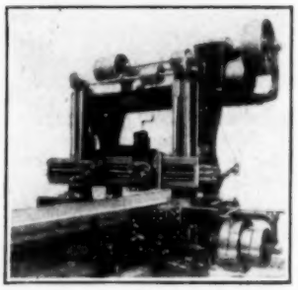
— 60 —

Planer, Heavy-Duty, with Gear-Box Drive

C. Redman & Sons, Ltd., Halifax, England. [Vol.68,p. 152E]

A feature of this heavy-duty planing machine is the 3-speed gear-box drive mounted on the self-contained countershaft. Cutting speeds of 30, 40, and 50 ft. per min., with a constant return of 100 ft. per min. are provided. It planes work 16x5 ft. x 4 ft. high.

The worktable is 42 in. wide by 16 ft. long between the



pockets. The bed is 24 ft. long, the centers of the Vs being 33 in. apart. Control is provided on both sides of the machine. The cross-slide is long enough to allow the front tool to plane the full width.

Four tool-boxes are provided, two on the cross-slide, and one each on the front and rear housings. The tool boxes are entirely universal and provided with power feed in any direction.

Floor space 36 ft. 4 in. x 12 ft. 10 in.; approximate weight 19 tons.

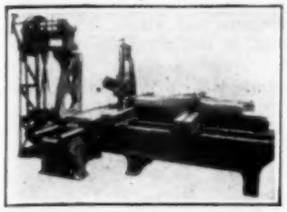
— 61 —

Planing Machine, End, Special

Summerskill Bros., Sowerby Bridge, England. [Vol.67,p. 252E]

The illustration shows an application of a small planer for machining large jobs at the end or side, which would otherwise necessitate the employment of a very large planer. The top faces of planing-machine housings, the ends of cross-slides, and the joints for long beds and tables are examples of the work handled.

The machine consists of the firm's standard 6x2-ft. square planer, with one of the uprights removed. The removed upright is replaced by two planer beds 8 ft. long, placed at right



angles to the main bed to which they are bolted and tongued. They have planed T-slots at the top instead of the usual V-guide ways. To secure the work, two T-slotted cross rails, approximately 8 ft. long are placed across these beds. The cutting tool and tool box are carried on a vertical standard bolted on the planing-machine table.

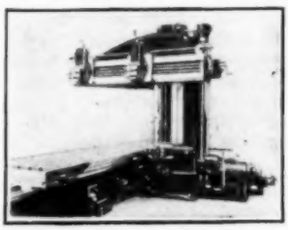
— 62 —

Planer, Heavy-Duty, Open-Side

Soag Machine Tools, Ltd., Horseferry Road, Westminster, S.W., England. [Vol.68,p.84E]

These open-side planers by the firm of H. A. Waldrich, Siegen, Germany, are available in sizes from 3 ft. 9 in. to 13 ft. 9 in. in planing width. The cross rail has automatic vertical feed controlled from the operator's position, all control being centralized.

The tool boxes on the cross rail and the side tool boxes have power feeds and quick traverse.



Both tool boxes can be engaged or disengaged simultaneously, and directly the quick feed is stopped, the ordinary feed comes into action.

These machines usually have a side tool box placed on the extended vertical V-guide of the cross rail. The feed box for this tool is attached to the housing, the feeding mechanism being the same as for the cross rail tool boxes.

The vertical travel of the cross rail is effected by means of a small motor or, in the case of belt-driven machines, by an additional belt from the countershaft. This drive is utilized for the quick power feed of the tool boxes.

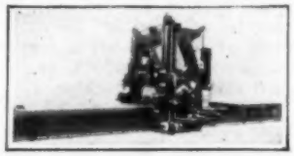
— 63 —

Planer, Tandem, Long

Butler Machine Tool Co., Ltd., Halifax, England. [Vol. 68,p.100E]

This 6x6x24-ft. tandem planer is designed to have one table loading while the other is operating. The 24-ft. table is divided into 12-ft. lengths, which may operate as one 24-ft. length. One table may be at rest while the other is operating on the full 12-ft. stroke. The drive is by 35-hp. motor.

The cross-slide carries two tool boxes with full swivel fronts. Each side tool box is independent and provided with an extra supporting slide to buttress the vertical slide when this



is overhanging. The cross-slide tool boxes can be operated together or independently.

Quick power traverse is provided for both the vertical and horizontal movements of the two tool boxes on the cross-slide and vertically for the side tools. Dial controls are used to regulate the stroke of the machine, and a tachometer shows the cutting and return speeds of the table.

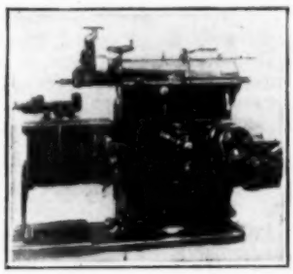
The accuracy of the machine is a feature. The guaranteed accuracy in any direction is within 0.002 inches.

— 64 —

Shaper, Crank, 30-Inch Stroke

Fletcher Bros., Halifax, England. [Vol.67,p.286E]

The stroke of this crank-driven shaping machine is 30 in. A 5-hp. a.c. motor drives direct. The machine admits work 20 in. deep from the top of the table,



and the table has an automatic cross feed of 30 in. Eight speeds are provided. The wheel spindle has a vertical adjustment of 6¼ in. Ten rates of feed provide a range from 0.003 to 0.03 in. per minute.

Shaping concave work is by hand feed only. The worktable is 30x16 in. wide by 17 in. deep. The table has vertical adjustment of 20 in., the elevating motion being by hand. Shafts up to 4 in. in diam. can be passed through the body of the machine for keyswaying.

Floor space 7 ft. 9 in. x 3 ft. 4 in.; weight 4,500 pounds.

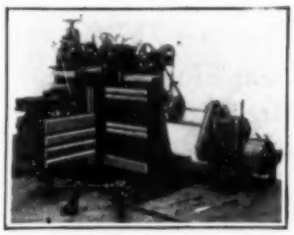
— 65 —

Shaper, Traveling-Head

Oldfield & Schofield Co., Ltd., Halifax, England. [Vol. 68,p.30E]

The four sizes of these traveling-head shapers have strokes ranging from 12 to 30 in. Drive may be by motor or by single pulley through a three-speed gear box.

The saddle carries all mechanism for operating the



ram or for varying the feed. Quick traverse up to and away from the work is available. Reversible feeds by power both down and along the bed, are available for the tool. The machine may also be fitted with attachments for slotting and gear cutting. It is arranged for circular shaping. Arrangements can also be had for cutting keyways.

A quick power motion enables the saddle to be brought rapidly to either end of the bed. There are six ram speeds, with three feeds for each speed.

Presses

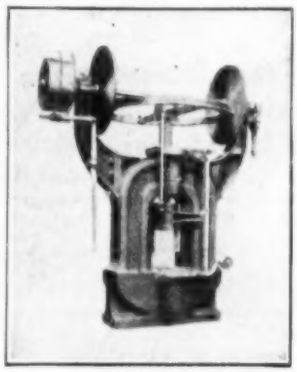
— 66 —

Press, Percussion, Friction-Screw

John Hands & Sons, Ltd., Birmingham, England. [Vol.68, p.18E]

The illustration shows the solid-frame type which gives a pressure of 125 tons and has a stroke of 14 in. This type of press has been especially designed for the production of hot pressings in steel and brass, but is also used for cold metal stamping, bending, embossing, and similar work requiring concentrated heavy pressure.

The machine can be set to run continuously with automatic reverse at any part of the stroke. When the machine is operated by hand the slide always returns to the top position. The ejector can be either



power- or treadle-operated. When made with wide frames these presses are particularly suitable for sheet metal stamping, forming, and raising.

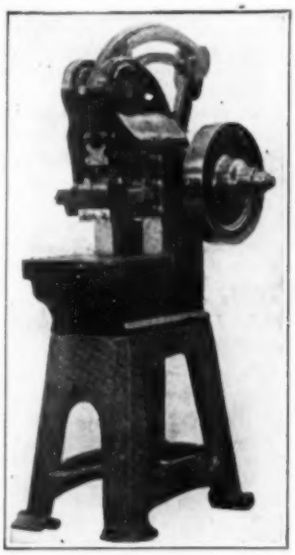
The screw is of forged steel. Other features include the ejector and automatic spring reversing stops, the latter giving sensitive control.

— 67 —

Press, Adjustable-Stroke

Oldfield & Schofield Co., Ltd., Halifax, England. [Vol. 68,p.32E]

In this line of Perl presses the stroke may be limited to ¼ in. and the number of strokes per minute may be doubled, thus doubling the output on blank-



ing operations. On the other hand, for drawing operations the stroke may be lengthened so as to give the requisite clearance.

The press is of the toggle type. Whatever the length of stroke, the bottom position of the ram remains the same. Thus tools of standard height may be used. An adjustment of stroke does not affect the tool setting in any way.

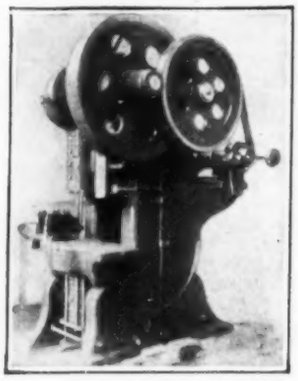
Weight 900 lb.; average blow 18,000 pounds.

— 68 —

Press, Inclinable, with Pneumatic Plate-Holder

Maschinenfabrik Weingarten, Weingarten, Wurtemburg, Germany. [Vol.68,p.71E]

This inclinable eccentric press is provided with a plate-holder controlled by air so that the drawing pressure remains constant during the whole operation, and work is obtained without wrinkles. Also, the air pressure adapts itself to inequalities in the thickness and hardness of the plate.



The air apparatus consists of a compressor, an accumulator, the necessary pipes, and the air cylinder embodied in the press beneath the table. The drawing operation is from the top to the bottom, and the drawn pieces are thrown out by an ejector at the rear of the machine.

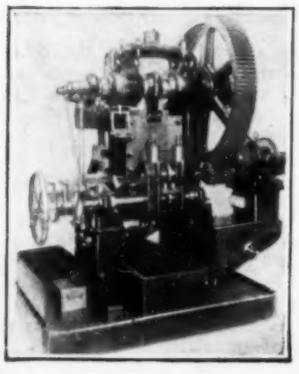
The precision adjustment of the slide of this press can be controlled while the machine is in motion.

— 69 —

Press, Nut

Gebr. Hubner, Chemnitz, Germany. [Vol.68,p.85E]

In 8 working hours this machine will produce 28,000 ½-in. nuts from cold wrought iron or mild steel. The machine is of the vertical type. All tools are of tool steel excepting the punch, which is of silver steel.



The nuts are produced in three operations, being first punched cylindrically for the hole, then cut-off, and finally trimmed to hexagon or other shape. The tools used for the first operation are a punch and die, for the second operation a cutter and die, and the third a punch and die, the punch being used for removing the burrs.

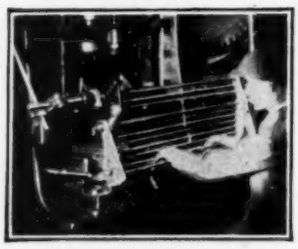
These machines are available in two sizes, the smaller being for nuts up to ¾ in. and the larger for ½-in. nuts.

— 70 —

Press Guard, for Wide Work

J. Broughton, Vere St., Birmingham, England. [Vol.68, p.33E]

This press guard is especially suitable for use with very wide tools and short-stroke presses. It is operated by a connecting rod attached to the end of the crankshaft of the machine, but may be actuated by the movement of the ram. It is carried on two angle brackets, one on each side of the machine.



The guide consists of two main members which are pivoted together and work in scissor-fashion, the opening allowing access to the work and the closing action sweeping away the hands and lightly entrapping them in a safe position, should they not be completely removed voluntarily. The closing can be timed to operate well in advance of the downward move of the ram.

Other Machines

— 71 —

Gear Hobber, High-Production, Pfauter

Dowding & Dickinson, Grosvenor Road, London, S.W., England. [Vol.68,p.83E]

This tool is reviewed under item 24, page 80, of the American section of this issue.

— 72 —

Gear Hobber, Improved

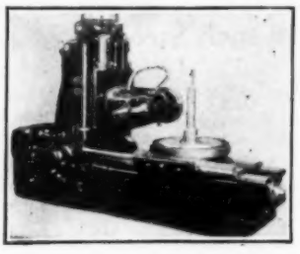
Dowdings' Machine Tool Co., Vauxhall, London, S.E. England. [Vol.68,p.98E]

Gears up to 71 in. diam. and 20 in. face, and up to 1½ D.P. can be cut with the largest size of the line of machines made by Schuchardt & Schutte, Berlin, Germany. Spiral gears can also be cut. Six speeds are provided. A total of 36 to 48 feeds can be obtained in the various sizes, the range being from about 1/40 to ⅛ inch.

The cutter head can be swiveled to a complete circle in either direction. The slide has quick power traverse in both directions, in addition to the standard feed motions. Fine hand adjustment is also available.

Shafts integral with the gears may be inserted and chucked, and shafts of unusual length may be placed through the table and bed. Quick travel is provided for the table in both directions.

In testing the capacity of the machines, chrome-nickel steel



gears with 31 teeth and about 9 D.P. have been hobbed at a cutting speed of about 100 ft. per min. and a feed of about ⅛¾ inches.

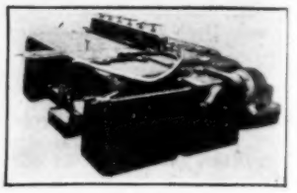
— 73 —

Sawing Machine, Ebonite

J. Holroyd & Co., Ltd., Milnrow, England. [Vol.67,p. 251E]

The maximum size of work cut by this sawing machine is 4x2 ft., or 4 ft. square. Its purpose is to cut sheets of materials such as ebonite into strips or rectangular pieces. A 2-hp. motor drives by belt. The work is clamped on the table, and cutting is done by means of a grinding disk which projects above the table and has longitudinal motion.

The cutting tool used may be a steel disk with six diamonds set on it, or steel saws or abrasive wheels may be employed. The cutting rate of abrasive wheels is lower than that of the diamond cutter, but the finish better. The maximum size of grinding wheel



taken is 8 in. in diam. by ⅛ in. wide.

Slow feed with automatic knock-off and quick return motions are provided. Feeds are from 2½ to 10 ft. per min., and the return 15 ft. per min. Cooling tank, pump and fittings can be provided, but with diamonds are not usually required.

Floor space 9 ft. 6 in. by 6 feet.

— 74 —

Sawing and Reaming Machine

J. Ackworthie, Ltd., Coleshill St., Birmingham, England. [Vol.67,p.264E]

This combined sawing and reaming machine is intended for cutting off the ends of metal tubing and burring the holes, and for similar purposes. The machine has two spindles, one revolving inside the other on ball bearings. The inner spindle carries the taper-burring reamer, while the circular saw is mounted on the outer spindle.

For cutting off light tubing, such as conduits, the saw re-

volves at about 2,500 r.p.m., and the burring reamer at about 800 r.p.m. A 15-in. saw is supplied as regular equipment.

Generally both ends of a tube need the same operation. The machines are therefore used in pairs, one right hand and one left hand spaced at about 12 ft. apart, so that each end of the tube can be sawed off and burred without turning the tube.

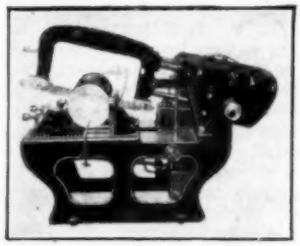
— 75 —

Hack Saw with Hydraulic Feed

B. Elliott & Co., Ltd., York Road, London, N., England. [Vol.68,p.8E]

This line of hack sawing machines features hydraulic pressure feed to the saws, thus giving a feed subject to infinite adjustment between the maximum and minimum.

The hydraulic system consists of an oil pump driven from the constant-speed main driving



shaft. The pump supplies oil pressure to a ram, the downward movement of which produces the cutting feed, the upward movement actuating the saw relief.

The vise has longitudinal adjustment on the bed and may be set for angular cuts up to 45 deg. A coolant pump is provided. The machines are available in three sizes, to cut round bars up to 5½, 9 and 13 in. in diam. Using cobalt-steel blades, the time on 2-in. mild-steel bars is 2 min. on the small machine and 1¼ min. on the largest machine.

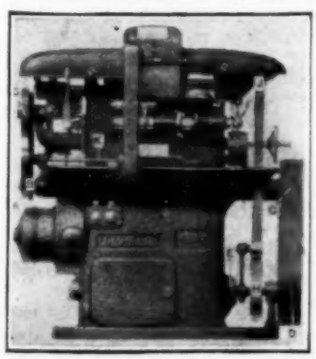
Net weights, 374, 880, and 2,090 lb., respectively.

— 76 —

Screw Machine, Automatic

George H. Alexander, Ltd., Birmingham, England. [Vol. 68,p.84E]

Ludw. Loewe & Co., Berlin, Germany, manufacture this automatic screw machine featuring drive by single pulley or by electric motor without the use of countershafting. The motor drives a shaft at the back of the



machine by chain. By means of interchangeable pulleys, this shaft drives the work spindle. Eight spindle speeds from 1,050 to 5,000 r.p.m. are provided.

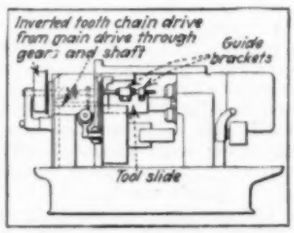
Drive is provided for thread-cutting and other attachments. Three speeds are obtained from the thread-cutting tools by exchanging pulleys. Screw-slotting, drilling and other attachments are driven by chain gearing. Both coolant pump and oil pump are included.

— 77 —

Drilling Attachment, for 4-Spindle Automatic

B. S. A. Tools, Ltd., Birmingham, England. [Vol. 68,p.100E]

The 4-spindle automatic to which this attachment applies was described and illustrated on page 188E, Vol. 67, of the *American Machinist*. By means of this attachment high-speed spindles can be applied to three positions of the work. The spindles are supported on the main tool slide by guide brackets into which are fitted



suitable bearings at one end, with a bearing support through the inner end frame at the driving end of the machine at the other end.

By the application of a chain drive from the work spindle shaft, the live spindle is driven by a splined chain wheel in the opposite direction to that of the work spindle. The cutting speed of the tool in relation to the work is greatly increased, by this attachment. In the case of drills, particularly, the design decreases the cutting time.

— 78 —

Shearing Machine, Universal

F. J. Edwards, Ltd., Euston Road, London, N.W., England. [Vol.68,p.19E]

The work for which this universal shearing machine was designed as internal, external, regular, irregular, straight, and curvilinear shapes and the cutting of sheets in mild steel up to No. 14 gage. It may be driven by hand, pulley, or direct by motor. The spindle runs on ball bearings. The depth of the gap is 30 inches.

The lower blade vibrates; the top blade is stationary. This feature enables the shearing line to be followed more easily. Blades are adjustable for wear. When dealing with internal shapes the top blade is raised by means of the lever, the sheet is inserted, and the blade is brought down again so as to pierce the sheet at the desired starting point when the cutting action proceeds.

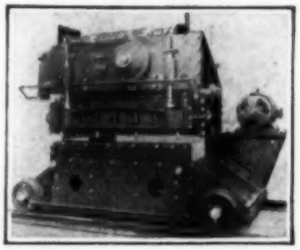
Weight, about 714 pounds.

— 79 —

Shears, Guillotine

Henry Pels, Osnaburgh St., London, N.W., England. [Vol. 68,p.46E]

The illustration shows the standard machine adapted for portable use, the capacity being for plates up to ½ in. thick by 5 ft. long. On work 5 ft. and



longer the blade holders are arranged so that provision can be made for cutting plates heavier than the normal capacity of the machine. The machine can also be arranged for taking off narrow scrap strips when trimming long plates.

The downholder is fully automatic and requires no special adjustment for cutting heavy or wide plates. The arms can swivel and accommodate themselves to plates of uneven thickness. Provision can be made for beveling plates at an angle of 15 deg. The depth of gap is 24 in. The clearance between the standards is 63 in. and the length of blades 66 in. The machine works at the rate of 18 strokes per min., taking 15 hp. The larger sizes of machines will cut plates up to 2 in. thick and 145 in. long. The armour-plate construction is particularly suitable for the attachment of wheels for portable machines.

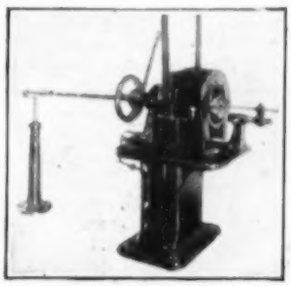
Net weight, 6¾ tons.

— 80 —

Cutting-Off Machine, Rotary, Bornemann

Alfred Herbert, Ltd., Coventry, England. [Vol.67,p.206E]

In this Bornemann rotary cutting-off machine, the material is held stationary by the means of a three- or four-jaw draw-in chuck. The cutters are



fed into the work by the centrifugal action of weights. Adjustable glycerine brakes regulate the feed to suit the cutting capacity of the tool and the hardness of the material being cut.

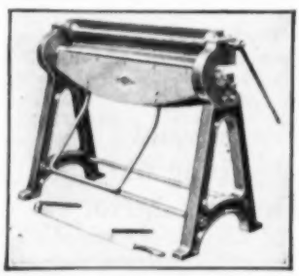
The machine is available in three sizes, either belt or motor driven, the maximum diam. of stock cut by each of the machines being 1⅞, 2, and 4¾ inches.

— 81 —

Cramp-Folding Machine, Open-Ended

F. J. Edwards, Ltd., 406 Euston Road, London, N.W., England. [Vol.67,p.218E]

Sheets of unlimited length can be handled on this open-ended cramp-folding machine. The edges can be bent to a depth of 1¾ in. Vertical adjustment is obtained independent of the



bearings. In addition to sharp corners, radii up to ¾ in. can be formed for lock seams having wired edges.

The machine is suitable for bending sheets up to No. 18 gage, but can also be supplied with a heavy blade for bending sheets up to No. 16 gage. It is built in three sizes with folding blades of 36½, 48½ and 72 in., the maximum lift of the top beam on the smaller machine being 1¼ in. and on the larger machines 1¾ inches.

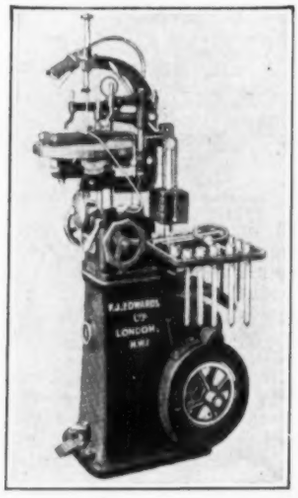
— 82 —

Filing and Sawing Machine

F. J. Edwards, Ltd., 406 Euston Road, London, N.W., England. [Vol.67,p.228E]

The combined filing and sawing machine is particularly adapted for the production of punches, dies, cams, and other intricate shapes that can be produced more easily by the vertical method of sawing.

The machine has a maximum



stroke of 4¾ in., a depth of gap of 8½ in., while the thickest material cut is 3¾ in. The supports are hardened and work in inclosed steel bearings. Where possible, ball bearings are used. Work is instantly started or stopped by a foot pedal. The stroke of the arm is adjustable. The table is adjustable vertically, and is arranged to swivel in both the longitudinal and cross directions to give an angular setting up to 15 degrees.

The number of strokes per minute may be up to 200, and files from 4 to 10 in. in length may be accommodated.

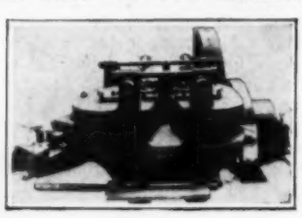
Weight, 440 pounds.

— 83 —

Forging and Upsetting Machine, Horizontal, No. 6

Selson Engineering Co., Ltd., Coventry, England. [Vol.68,p.161E]

Average heads can be formed on material 3¼ in. in diam. with this machine. The dies are 16x16x6¼ in. The machine is all steel. A 4-in. automatic



opening and closing movement of the left-hand die is provided, and the right-hand die can be withdrawn by hand when necessary, the opening by hand being 2½ in., thus giving a total opening of 6¾ in. The total stroke of the head slide is 10¼ in., and the stroke after the dies have been closed is 5½ inches.

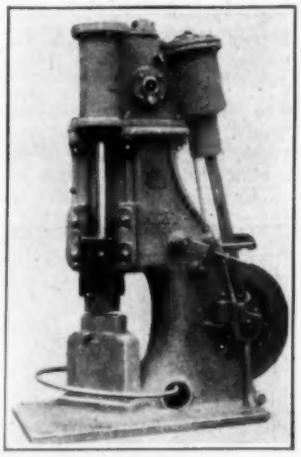
The estimated number of actual upsets in an 8-hr. day is 3,000. Four safety breaker-bolts are provided in various places. A triple tool holder is provided.

— 84 —

Power Hammer, Pneumatic, with Steady Hold-Up

B. & S. Massey, Ltd., Openshaw, Manchester, England. [Vol.67,p.232E]

This machine is capable of striking single blows as well as automatic continuous ones. A special arrangement of the valves and ports enables the tup to rise smoothly without vibration and to be held steadily



without pulsating movement. A reservoir of air is used for holding up. A constant pressure is maintained under the hammer piston instead of the usual fluctuating pressure.

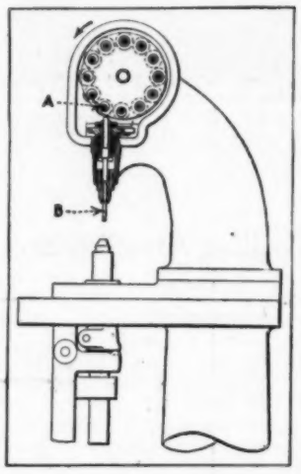
Single blows can be struck from any point in the stroke and at any desired moment, without the use of a timing device and without fear of a second blow following unintentionally. Thus with the steady hold-up device, the pneumatic hammer has been brought fully into line with steam hammers. A 300-lb. hammer is illustrated.

— 85 —

Riveting Machine, High-Speed

Selson Engineering Co., Ltd., Coventry, England. [Vol.68,p.151E]

Max Hasse & Co., Berlin, Germany, manufacture these high-speed riveting machines with revolving heads, each with disks between which are a series of free running rollers *A*. As the disks rotate, blows are given to the punch *B*, the disks swinging outward some-



what owing to the centrifugal force. The work is placed on an anvil which is then raised by pedal to the punch. In addition, the punch itself is given a rotary motion.

The machines in various sizes are suitable for solid iron rivets up to ⅝ in. in diam, and for larger rivets of brass or aluminum. Various riveting tools are available, to form raised or countersunk heads. The high speed of the blows, which may be 10,000 per min., combined with their springy character, and the rotary motion of the punch are features.

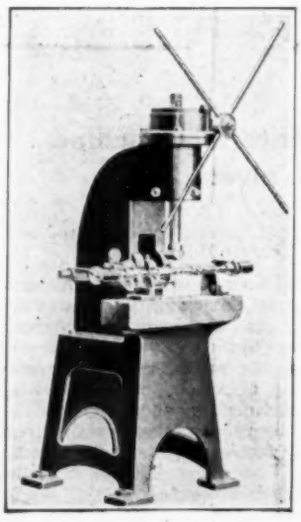
The machines are available in six sizes having gaps ranging from 7⅛ to 9⅛ inches.

— 86 —

Straightening Machine

Oldfield & Schofield Co., Ltd., Halifax, England. [Vol. 68,p.32E]

This straightening machine is available in three sizes, one being intended to meet the re-



quirements of manufacturers of motor cycles, another to suit the needs of automobile manufacturers, and the third for tube work up to 6 ft. long. The machine illustrated has a maximum distance between centers of 28 in., the height from the center of the work to the floor being 3 ft. 3 inches.

The table of the machine is made solid with the headstock and has a planed square slot along its length. It carries pressure headstocks which can be made in any form suitable to the work in hand.

The amount by which the work is out of true can be read on a dial, while the headstock is lifted to clear the work. The ram is then brought into action for straightening purposes. The dial also shows the amount of inverse bend necessary to overcome the elastic limit of the material. It is, therefore, possible on repetition work to deal with a whole batch at approximately one pressure.

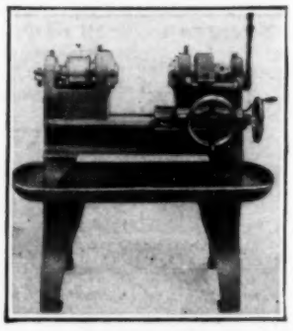
Weight, 1,700 pounds.

— 87 —

Running-In Machine, Gear

Charles Taylor, Ltd., Birmingham, England. [Vol.68,p.31E]

Spur gears at maximum centers of 6 in. may be run-in on this machine. The bed carries two headstocks: One is fixed, and the other is carried



on a saddle adjustable along the bed for position. A cross-slide is also provided.

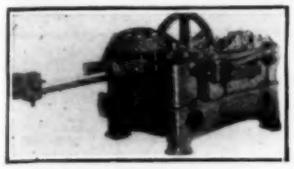
Both heads are mounted on Timken roller bearings and either may be provided with a brake with which the load on the gears may be adjusted. The gears to be run-in may be mounted on mandrels, or when already on self-contained shafts, the latter are held in draw-in collets.

— 88 —

Eye-Rolling Machine, Combined

Soag Machine Tools, Ltd., 45 Horseferry Rd., London, S.W., England. [Vol.68,p.45E]

Finished eyes on laminated springs for railway wagons and automobiles is the work for this



combined eye-rolling machine. It has a capacity of 6x⅜ in. with a maximum outside eye-diameter of 2¾ in. in spring steel. The rolling tools are interchangeable. Safety stops prevent damage in case of jamming.

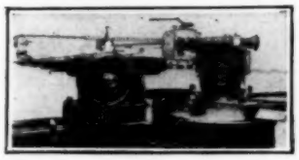
The eye is made in one heat in three consecutive operations, consisting of advance rolling and pointing of spring end, rolling of the eye, followed by a final operation of truing the hole by driving in a pin and pressing. The spring leaves are previously cut to length and are fed into the clamping device after being heated.

— 89 —

Winding Attachment, Helical, Left-Hand

Dowdings' Machine Tool Co., Ltd., Albert Embankment, Vauxhall, S.E., England. [Vol.68,p. 58E]

The Oerlikon machine for the edgewise winding of copper strip, ordinarily produces coils of round, oval and rectangular



form in strips 0.472 in. thick by 2.36 in. wide, and, if necessary, will deal with sections up to 1.9 in. square, in right-hand coils. By means of this auxiliary device, left-hand windings can be made. The attachment can be fitted to all existing machines of the firm's make.

The forming drum is suspended from a carrying plate, the coil being wound upwards. The bending roller, the pressure and guide slides and plates, the raising and lowering mechanism, and a roller for the chain for guiding the strip, complete the apparatus.

— 90 —

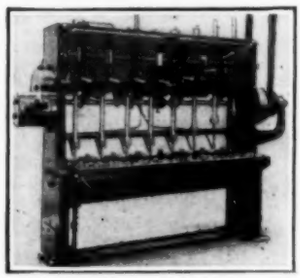
Nut-Tapping Machine, Semi-Automatic

Gebr. Hubner, Chemnitz, Germany. [Vol.68,p.70E]

The output of this semi-automatic nut tapping machine is up to 5,000 1-in. nuts in an 8-hr. day, 8 nuts being tapped simultaneously. The taps are vertical and are secured by means of quick-acting chucks which can be operated while the spindles are running. Five speeds of reciprocation are now provided.

On the table a fixture is provided to accommodate nuts of all sizes within the range of the machine. A coolant pump is provided.

The operator moves from



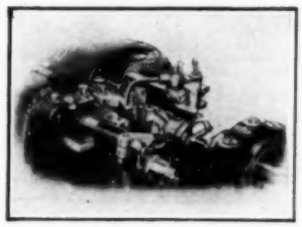
spindle to spindle, placing the blanks under the automatically raised tap. After the tapping operation, he removes the tap and the nut, replacing the tap in the chuck. It is possible with nuts up to ⅝ in. in diam. to obtain continuous tapping.

— 91 —

Nut Cutting Machine, Automatic, High-Production, Small

Hahn & Kolb, Stuttgart, Germany. [Vol.68,p.150E]

This automatic nut machine is intended solely for the manufacture of small nuts from drawn rods. The nuts are drilled, turned, countersunk on both sides, and tapped. The



process is entirely automatic, and the production rate in brass is 40 nuts per minute.

The speed of the work spindle is variable in eight steps from 1,000 to 5,000 r.p.m. The tap runs at 3,000 r.p.m. in brass, and 600 r.p.m. in mild steel.

With the normal feed tube, the machine will take squares up to $\frac{5}{32}$ in. side, and hexagons up to $\frac{1}{4}$ in. across the flats, or squares up to $\frac{1}{4}$ in., and $\frac{3}{8}$-in. hexagons by means of a special feed tube. The minimum and maximum diam. of threads are $\frac{3}{32}$ and $\frac{1}{4}$ in. for brass, and $\frac{1}{8}$ in. and $\frac{1}{4}$ in. for mild steel.

Space occupied 55x26 in.; weight 1,200 lb. net.

— 92 —

Spring Clip Machine, Turning and Facing

Selson Engineering Co., Ltd., Coventry, England. [Vol.68, p.151E]

This machine is intended primarily for turning and facing the ends of spring clips before they are screwed. The work is held in a fixture and the actual machining is done by means of

horizontal, revolving tool heads. The spindle heads are arranged in two pairs and can be adjusted to some extent to suit work of various sizes. The spindles are mounted in Timken tapered roller bearings.

Each roller tool head is a revolving unit and has been designed to suit the close centers of the work. A coolant pump is provided.

Power and hand feeds are provided. The machine has two tables, each with two tool heads. One fixture is loaded while the other is feeding, but both tables cannot be feeding simultaneously. An output of 150 clips per hour can be maintained.

Gaging and Testing Equipment

— 93 —

Optimeter, Projection, Zeiss

Dowdings' Machine Tool Co., Ltd., Vauxhall, S.E., England. [Vol.68,p.123E]

This Zeiss projection Optimeter is described in Item 181, page 104, of the American section of this Shop Equipment Review issue.

— 94 —

Pipe Templet, Tubular-Frame

L. Ferguson, Ltd., 95 Bath St., Glasgow, Scotland. [Vol.68, p.152E]

The frame of this Sturrock universal pipe templet consists of various lengths of steel tubing, connected by hinged joints which allow the tubes to be set to any angle desired. The templet takes the place of the special wooden templet usually employed for making pipes fit between existing flanges.

The three figures in the illustration show the procedure adopted. The first shows the method of taking the set from two existing pipes of simple location. With the joints tightened in position, a templet is formed which may be removed

from the flanges and sent to the pipe shop for making the negative frame.

The negative, as indicated by the second figure, consists of a second external frame built up to duplicate the relative position of existing pipe flanges.

The third figure shows the testing of the finished pipe by means of a negative frame.

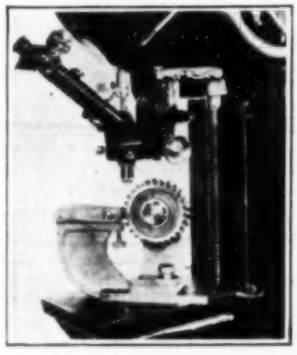
— 95 —

Hardness Tester, for Gear Teeth

Vickers, Ltd., Broadway House, Westminster, S.W., England. [Vol.67,p.229E]

This machine takes the form of a special diamond and holder for use with the Pyramid hardness testing machine made by the above firm.

The mount is cut away so as to permit the diamond to reach under the tooth adjacent to that being tested. The device consists of a diamond set in a mount of special form, the mount being secured to a plate hinged to a spring cap. Any portion



of the face of the tooth from the pitch line outwards may be tested.

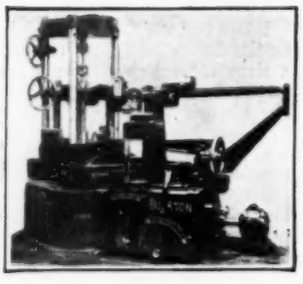
In operating on repetitive work, the gear is placed on the shaft and an impression is made with a load of 50 kg. After a series of impressions on the same or different gears have been made in this manner, the stage of the machine is lowered, and the impressions are then measured or checked by a microscope. Accurate tests may be carried on at the rate of 200 per hour.

— 96 —

Testing Machine, Universal, 50-Ton

J. Buckton & Co., Ltd., Leeds, England. [Vol.67,p.230E]

Tension, compression, and bending tests on all materials is the field of this machine. It admits specimens in tension or compression up to 24 in. and in bending up to 36 in. maximum span, applying any load up to 50 tons in any of these tests.



Three rates of applying the load are provided with a quicker speed for adjustment. A hand gear is used for small increments of strain. Grips are readily engaged or disengaged.

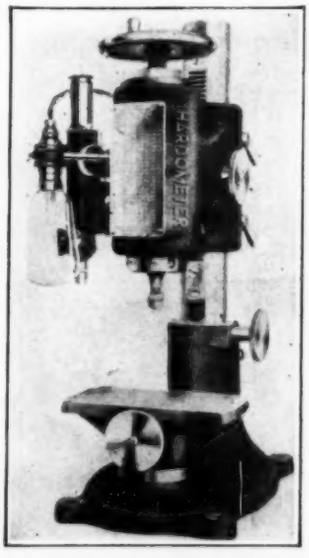
Deflection loads may be applied to the specimen without producing local damage. All steel knife-edges and seats may be removed and replaced without disturbing the accuracy of the machine. Provision is made for accurate readings down to 5 pounds.

— 97 —

Hardness-Testing Machine

Thos. Firth & Sons, Ltd., Sheffield, England. [Vol.68,p. 60E]

The machine works on the same principle as the standard Brinell machine, but employs a lighter load, a smaller ball, and a microscope of greater magnification. Metals harder than the Brinell ball itself may be tested by means of a diamond



indenter, and by employing a larger ball the range of soft non-ferrous metals is covered.

The machine is readily fixed on a bench, measures 19x12x11½ in. and weighs 60 lb. It will take articles up to 8 in. thick and has a measurement of 4 in. from indenter to column.

The No. 1 machine, having a load of 120 kg. and a microscope of 50 magnifications, will test steel articles down to a thickness of ½ mm. No. 2 machine will test especially thin sheet metal with a load of 30 kg. and a microscope of 100 magnifications.

Miscellaneous Equipment

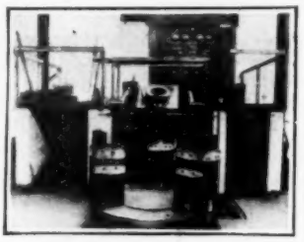
— 98 —

Electric Furnace, High-Frequency, for Steel

Electric Furnaces Co., Ltd., 17 Victoria St., London, S.W., England. [Vol.67,p.226E]

The melting capacity of this Ajax-Northrup furnace is 450 lb. The current taken is 150 kva., the time required for a melt being somewhat less than an hour, and the output per week is about 20 tons. Current costs are about 42s. per ton.

The melting pots last about 12 heats as compared with three or four in the case of the ordinary crucible process. The high-frequency furnace is used for melting, and not for refining. The furnace itself consists of a crucible container, insulated with about 1 in. of sand, and around which is a helical coil carrying the high-frequency current and forming the inductor. It is cooled by circulating water. A motor generator supplies current at 1,200 volts and a frequency of about 2,200 cycles. The body of the furnace is arranged to tilt the pot for pouring.



The furnace was built in the United States at Trenton, N. J., by the Ajax Electrothermic Corporation, Division of the Ajax Metal Company.

— 99 —

Furnace, Heat-Treating, Tool

Hardy Patent Pick Co., Ltd., Sheffield, England. [Vol.67,p. 251E]

The Todd furnace is intended for use in the hardening of chisels, drills, and other tools. It is readily portable. The fuel used is small coke, breeze, or coal. The furnace will take 24 tools, in three tiers of eight

holes each. A ring is provided for covering the holes of each tier so that any desired number of tiers may be operated at one time. The entire furnace is arranged to revolve.

The inside of the body is lined with silica fireclay 1-in. thick, arranged in four segments, and the bottom is also protected with silica fireclay. The top of the body is conical and an opening is provided for the introduction of fuel.

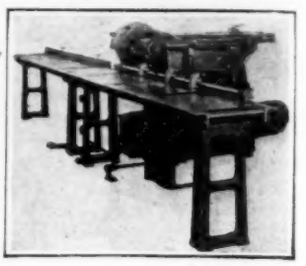
— 100 —

Crosscut Saw, Motor-Driven

Wadkin & Co., Leicester, England. [Vol.68,p.19E]

Individual direct-connected motor drives are provided for both the saw and feed motion of this automatic crosscut saw. The saw-spindle motor is 5 hp., and a 2-hp. motor is used in driving the feed motion for the saw carriage.

With a standard 18-in. saw, the machine will cut material 20 in. wide by 4½ in. deep, the speed of the saw spindle being 2,800 r.p.m. This machine is



adapted for close accurate work, and the action is entirely automatic. The throw-out motion can be put out of operation, a continuous backward-and-forward motion being given to the saw carriage.

Weight 1,500 lb. net.

— 101 —

Saw, Single-Dimension, Canting-Spindle

Wadkin & Co., Leicester, England. [Vol.68,p.45E]

Instead of the table, the saw cants in this machine up to 45 deg., the motion being indexed.

The table is in two parts. The front portion slides on ball bearings and the back portion is stationary. Gaps of any width up to 4 in. can be obtained between the sliding and main table, thus allowing grooving saws or cutters to be used.

The front table is marked out in degrees. The machine will crosscut 4 in. deep up to a width of 30 in. or 1 in. deep up to a width of 36 inches.

— 102 —

Cage for Roller Bearings

Auto Machinery Co., Ltd., Coventry, England. [Vol.67,p. 251E]

This cage consists of a solid bronze-alloy ring which is located on the outside diameter of the inner ring. The faces

of the square holes for the rollers are broached true with the track in which the rollers run, so that the cage not only retains the rollers but also holds them perfectly square for running purposes. The construction also allows the maximum number of rollers to be fitted. These cages can be supplied for roller bearings of all standard sizes which the above firm makes.

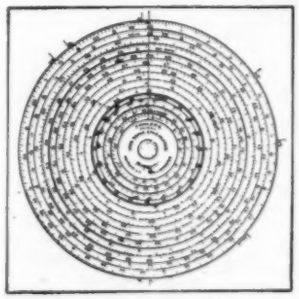
— 103 —

Calculator, Long-Scale

Fowler & Co., Station Works, Sale, Manchester, England. [Vol.68,p.168E]

The actual diameter of this instrument is 4⅜ in. It is completely inclosed in a nickel-plated metal case.

The large diameter permits longer scales, larger figures,



and greater accuracy than is possible with a "vest-pocket" design. The single, short scale around the outer circumference for instance, has a length of 13½ in., while the long scale extending around 6 in., has a length of 50 in. and permits of accurate readings to four significant figures.

— 104 —

Reflector Fittings for Workshop Lamps

Philips Lamps, Ltd., 145 Charing Cross Road, London, W.C., England. [Vol.67,p.218E]

No separate reflector is necessary with this fitting as the inner surface is coated with white

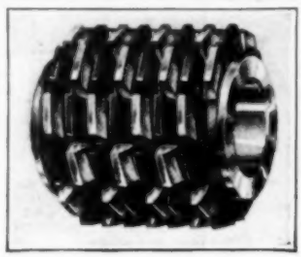
enamel. It is made of black sheet iron. The design is suitable for wide spacing and for vertical illumination. The reflectors are available in four standard sizes ranging from 12 to 18 in. in diam. Fittings for indoor and outdoor lighting are also supplied with white enameled reflectors that can be used either convex or concave.

— 105 —

Gear Hobs, High-Production

Birmingham Bureau of Standards & Measurement, Ltd., Great Charles St., Birmingham, England. [Vol.68,p.187E]

The Ateliers de Fabrication d'Outillage Modern pour Engrengages, Bois-Colombes, France, make the hob shown, the out-



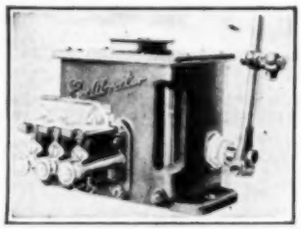
standing feature being that in the longitudinal rows of teeth, every alternate recess between adjacent teeth has its flanks and root ground to exact dimensions, while the other recesses in the row are ground to a greater depth. The hob is gashed to an odd number, the effect being to place the recesses of exact dimensions between deeper recesses along the helical path.

— 106 —

Lubricator, Force-Feed, for Machine Tools

Petters, Ltd., Yeovil and Ipswich, England. [Vol.68,p.263E]

The "Calibrater" is a mechanical positive sight-feed lubricator suitable for application to all kinds of machinery and heavy-duty machine tools. It is available in several sizes, the



number of feed pipes ranging from 2 to 12, and the nominal working capacity from 3½ to 10 pints. The working parts are readily accessible for cleaning and replacement.

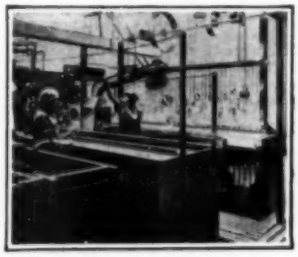
The apparatus consists of an oil tank to which all the pump units are attached externally. Oil of any viscosity can be pumped, and the amount delivered by each pump can be regulated. The unit is self-priming.

— 107 —

Plating Plant, Chromium

W. Canning & Co., Ltd., Birmingham, England. [Vol.68, p.19E]

The outfit consists of a lap-welded steel vat with suitable heating coils, and main cathode



and anode rods of high-conductivity, solid-drawn copper to carry the heavy currents required. The anodes are of sheet lead. An exhausting apparatus is provided for removing the fumes from the anodes and cathodes, together with ducts connecting the vat, and a condenser for trapping the solution.

The chromium solution works at a current density of 70 to 80 amperes per sq.ft. of cathode surface.

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Large size vertical and horizontal planing machine	58	134
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Butler Machine Tool Co., Ltd., Halifax, England		
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Edwards, Ltd., F. J., Euston Road, London, N. W., England		
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Filing and sawing machine	82	138
Electric Furnaces Co., Ltd., 17 Victoria St., London, S. W., England		
High-frequency electric furnace for steel	98	140
Elliott & Co., Ltd., B., York Road, London, N., England		
Hack saw with hydraulic feed	75	137

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Ferguson, Ltd., L., 95 Bath St. Glasgow, Scotland		
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Firth & Sons, Ltd., Thomas, Sheffield, England		
Hardness-testing machine	97	140
Fletcher Bros., Halifax, England		
Crank shaper, 30-inch stroke	64	135
Fowler & Co., Station Works, Sale, Manchester, England		
Long-scale calculator	103	141

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Graham & Normanton, Halifax, England		
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Hahn & Kolb, Stuttgart, Germany		
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Hands & Sons, Ltd., John, Birmingham, England		
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Hardy Patent Pick Co., Ltd., Sheffield, England		
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Hulse & Co., Ltd., Salford, Manchester, England		
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Jones & Shipman, Ltd., Leicester, England		
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Karger, G., 52 Krautstrasse, Berlin, Germany		
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Kitchen & Wade, Halifax, England		
Locomotive tube-plate drilling machine	20	128
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Maschinenfabrik Weingarten, Weingarten, Wurtemburg, Germany		
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Massey, Ltd., B. & S., Openshaw, Manchester, England		
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Noble & Lund, Gateshead, England		
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Oldfield & Schofield Co., Ltd., Halifax, England		
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Pels, Henry, Osnaburgh St., London, N. W., England		
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Soag Machine Tools, Ltd., 45 Horseferry Road, Westminster, S. W., England		
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Town & Sons, F., Halifax, England		
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United Machine Tool Co., Ltd., Holborn Hall, London, W. C., England		
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Vickers, Ltd., Broadway House, Westminster, S. W. England		
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Wadkin & Co., Leicester, England		
Motor-driven crosscut saw	100	140
Canting-spindle, single-dimension saw	101	140
Ward, Haggas & Smith, Keighley, England		
Locomotive tire boring mill	6	125
White Machine Tool Co., Ltd., Halifax, England		
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Wickman, Ltd., A. C., Coventry, England		
Multiple-spindle vertical drill	13	127
Tool and cutter grinder	30	130
Plain universal and vertical milling machine	54	133

NEWS OF THE WEEK

New Forging Method Demonstrated

At the invitation of the National Machinery Co., Tiffin, Ohio, forging engineers and others especially interested in forging advances, visited its plant during the week of July 9 to inspect new forging machines and particularly the new method of forging which these machines make possible. The development is in the forging of work having a hollow center, which may either be pierced entirely through the piece or only as far as desired.

The method differs from the extrusion process used on softer metals and also from the usual punching of hot forgings. For, instead of removing the hollow portion by punching, it is pierced by a tool of special shape so as to cause the metal to flow into the die. This method not only saves nearly all of the metal that would otherwise be punched out but also compresses the metal next to the hole and so improves its quality.

The method is applied to forgings with either thick or thin walls and the holes or recesses are held within limits that permit broaching without drilling if desired. The construction of the machines and dies also permit the outside of the forgings to be held to closer limits than was previously possible.

Simplification of Skid Platforms and Lift Trucks Approved

A general conference of manufacturers and users of skid platforms and lift trucks, hand and power, held June 28 at the Department of Commerce, under the auspices of the Division of Simplified Practice, approved a proposed simplified practice recommendation for the dimensions of lift trucks and skid platforms.

The conference passed resolutions that two standard dimensions, 8 and 12 in. be adopted for under clearance of skid platforms; and that the minimum clearance between runners or supports of skids be not less than 29 in. The conference also favored the establishment of standard dimensions for over-all length and width of skid platforms, with the proviso that there be two standards, one to be such that this size of skid can be placed three abreast in a freight car, and the other the same length as the first skid, but twice the width.

The conference agreed on a standard terminology for skid platforms as follows: Skid platforms—a platform mounted on skids or legs that can be easily moved from place to place. Skid stock boxes—a platform with closed sides and ends, forming the shape of a box, mounted on skids or legs, so that it can be easily moved from place to place. Hand lift truck—A 3- or 4-wheel truck, the upper platform of which is adjustable to different heights, this adjustment being made by hand and the truck propelled by hand power. Power lift truck—A 3-, 4- or 6-wheel truck, the platform of which is raised or lowered by power, and the truck and load it carries propelled by power.

This recommendation, subject to acceptance on the part of the interested elements of the industry, will become effective October 1, 1928. The membership of the standing committee is comprised of Robert A. Lesher (chairman); J. W. Gerber, Southern Railway; N. C. Damon, National Automobile Chamber of Commerce; C. B. Crockett, Society for Electric Development; W. A. Meddick, Lakewood Engineering Co.; Walter C. Stuebing, Stuebing Cowan Co.; and Edwards L. Leeds, of Leeds, Fozzer & Company..

Machine Tool Costs to be Discussed at Management Convention

"How uniform cost accounting was established in the Machine Tool Industry," is the subject of a paper to be presented by Ernest F. Du Brul, general manager of the National Machine Tool Builders' Association at the autumn convention of the American Management Association, Nov. 13 to 15. Chicago has been selected as the convention city, with headquarters at the Palmer House.

H. B. Gilmore, secretary of the Western Electric Co. and chairman of the program committee, has arranged for a series of half-day discussions on important subjects, including the following: Compensation of executives; the tools of budgeting; management and research activities in American companies; pensions and methods of finding work for men past middle age; health education and activities for employees; functions of presidents, chairmen of the board and boards of directors.

The Institute of Management will hold a technical and business meeting on Monday, Nov. 12, and the conference of office executives will be held on Friday, Nov. 16, at the Palmer House.

Engineering Educators Meet in South

The Society for the Promotion of Engineering Education held its 36th annual meeting, June 26-28 at the University of North Carolina. The report of the Board of Investigation and Coordination received much prominence. Charged with the responsibility of keeping engineering education apace with industrial advancement, this committee is doing some of the most important work in the society. A critical appraisal of engineering education in the United States was followed by recommendations of future organization and activity.

A feature of the meeting was a paper by R. I. Rees, American Telephone & Telegraph Co., on "College Experience in Its Relation to Achievement in Industry." By the use of charts, Mr. Rees showed a striking comparison between the advance of the employees within the company and their relative academic standing in school. Extra-curricular activities also made a favorable impression on the charts. This upsets the somewhat popular belief that academic standing and outside activities have no bearing on a career after leaving school.

Ohio State University, at Columbus, Ohio, was selected for next year's meeting. The new officers are: President, Dean Dexter S. Kimball, Cornell; vice-presidents, Dean C. C. Williams, University of Iowa, and Dean G. M. Braune, University of North Carolina; secretary, F. L. Bishop, University of Pittsburgh; treasurer, W. O. Wiley, John Wiley & Sons.

Harvard Advertising Awards Modified

A new prize of $1,000 will be offered this year by Harvard University for the most effective use of a display line in advertising. The four campaign awards of $2,000 each will be continued, as follows: for a national campaign of a specific product; for a local campaign for a specific product or merchandise; for a general or institutional campaign; and for a campaign of industrial products. The award for the best advertising research has been discontinued because it is felt that this award has not been an effective stimulus for this type of work. The gold medal for distinguished service to advertising is again included among the awards. James H. McGraw was the recipient last year.

The Harvard Advertising Awards were founded by Edward W. Bok.

The Business Barometer

The outlook in Commerce, Finance, Agriculture and Industry

By THEODORE H. PRICE

Editor, Commerce and Finance, New York

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CREDIT is the life-blood of business, and it is entirely natural that its scarcity or abundance should have a direct effect upon the organism through whose veins and arteries it flows. Therefore the announcement that the Federal Reserve Bank of Chicago had raised its rediscount rate to 5 per cent was last week's most important news. The lead thus taken was promptly followed by the regional banks of New York and Richmond. The other banks are expected to follow suit and the advance is accepted as notice that the authorities of the Federal Reserve System feel there will not be credit enough to meet the demands of commerce, unless there is a substantial reduction in the total of what are called brokers' loans. But it is also coming to be understood that these loans are not all brokers' loans, and that many of them are in reality bankers' loans, whose proceeds have been used to finance recently offered securities that have not been absorbed by the investment public. The process of distribution and digestion will therefore be slow, and as it would be folly to force it, a period of prolonged but orderly liquidation in the security markets appears to be in prospect.

The facts upon which this conclusion is based have been put so often before the readers of this review that it is hardly necessary to re-state them. Briefly, they include the credit expansion made possible by the large stocks of gold held in the United States a year ago, the resulting boom in the stock market, the borrowing that it entailed here, and the stringency that commenced to be felt when Europe began to demand specie for all but a part of the enormous balances she had accumulated here, either by borrowing or remittance. The sequence has been perfectly logical and, while the federal reserve banks may be blamed for the consequences, it is difficult to see how it could have been avoided without putting a strait-jacket upon American optimism and initiative.

It is futile to look backward. We are confronted by a condition rather than a theory and the question is "will American business be hampered or restricted by the moderate advance in interest rates and the liquidation upon which the securities market seems to be entering?" To this question the answer is "no," provided nothing occurs to seriously disturb confidence. This is an important proviso, for it often happens that some rottenness is uncovered as the tide of inflation recedes. But in the present case the recognized monitors of business have been so unanimous in advising caution, and bankers and brokers have been so careful to protect themselves that any serious debacle seems unlikely.

WHAT'S DOING IN INDUSTRY

AS THE summer wears on, more reports come in as to seasonal dullness, but this condition is by no means universal. In Cleveland the spurt in orders noted in the last two weeks of June has entirely subsided, but production is actually increasing. In Detroit few orders for machine tools are reported and a decided drop is expected, but business in this line is at a higher level than for the same period last year, and general business is good.

GENERAL business is also holding up well in Philadelphia, although many machine tool dealers and manufacturers state that midsummer dullness is upon them. In Buffalo, after a spotty June, a slump also has set in. Milwaukee, on the other hand, reports that the volume of tool business is holding its own. In Cincinnati also business is at a normal level. According to data compiled by the National Machine Tool Builders' Association, orders still remain at a high level.

INQUIRIES in the New England district are light, but despite this condition, July business is expected to be well above the average. Unlooked for orders have also kept the machine tool market in Chicago at a high level, and no slump is foreseen. Nor is any drop noted in New York, although several dealers are finding only two buyers of any account.

Meantime some signs of a business revival are already discernible, and it is not improbable that we will soon see greater activity if the demand for merchandise is not checked by speculative advance in prices. As against such an advance a moderately high rate for financial accommodation is in itself a protection, and it seems improbable that the manufacturers who have been so bitterly complaining of overproduction will cut their own throats by attempting to lift prices while unsold stocks are still large. This is particularly true of the cotton goods trade. Many of the American mills were shut down during the week ending July 7, and it is now expected they will suspend operations for another week in July and two other periods of a week each in August and September.

It is hoped that this curtailment will work an improvement in the price, but this hope has been to some extent dashed by a report from the Department of Agriculture which estimated the increase in the cotton acreage planted at 11.4 per cent. This estimate caused a decline of nearly one cent a pound in cotton futures and, while a portion of the decline has been recovered on the reiteration of crop damage reports, it is plain that sentiment has been changed.

But while the trade in cotton goods is halted by the uncertainties mentioned, the distribution of other merchandise is fully up to normal for the season, and it seems to have been helped rather than hindered by the hot weather.

Speculation in grain has been quiet. There is more or less conflict of opinion with regard to the yield of corn and wheat and the feeling is that both are high enough unless the harvest shall prove so disappointing that producers will feel justified in holding. Sugar is another commodity from which speculation seems to be withdrawing.

In the steel industry concrete evidence of improvement is to be found in the increase in unfilled orders reported by the U. S. Steel Corporation and the enlarged output of the independents. But it is said that buyers are quick to resist any advance and that they withdraw whenever an attempt to rush them is made.

In the larger cities there is no perceptible decrease in new building and if there is any unemployment it is below normal except at New Bedford, where the cotton mill strike continues. Net railway earnings are commencing to run ahead of last year. An improvement in the lumber industry is reported from the Northwest. The business in leather and shoes is better and trade generally seems to be getting on an even keel. Even the political campaign is being put on a business basis and it is no longer spoken of as a disturbing influence.

The Industrial Review

Weekly progress of the machinery and machine tool business

THE following reports, gathered from the various machinery and machine tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

PHILADELPHIA

A midsummer dullness appears to have settled over the machinery and machine tool business, judging from reports of some of the dealers and producers in the Philadelphia area this week.

A spotty condition prevailed in the general line, with some of the automobile companies from Detroit entering the market for some replacement orders. Business generally was reported fair, however, with inquiries in some lines bearing an unusually hopeful tone.

Some of the dealers said July is keeping abreast of the corresponding month of 1927. Dealers in and producers of testing machines, forging hammers, grinding machinery and general tool lines, reported a fairly active period during the last two weeks. Producers of shapers, millers and heavy equipment for railroads found in that period there had been a falling off in orders.

There was no discouragement, however, particularly in view of the hopeful inquiries that have appeared during the last two weeks.

BUFFALO

Reports from machine tool dealers indicate that the usual summer vacation slump has really set in. Nothing very excited in the way of business is expected now for several weeks. June business was spotty. Most of the dealers reported that it was under that of June, 1927, while one or two gave more satisfactory reports.

In the electrical supply field, there is and has been throughout the spring a distressing lack of big business, although a quantity of small orders continues in fair volume. June volume, however, was under that of a year ago. Some sales have gone into stone crushing and sand handling equipment. Power companies are spending little money in extensions, and practically no additions are being made on central station equipment.

Road building and construction contractors' equipment is still in demand to some extent, but the price situation continues bad.

CINCINNATI

Taking the machine tool industry of the Cincinnati district as a whole, business was at a fair level the past week and normal for the season. A portion of the manufacturers report a slightly larger volume of sales than in the previous week and none report a reduced volume of business. "There has not been as much of a summer slump as I expected," stated one manufacturer, and this seems to be the feeling of the majority of the heads of concerns.

Selling agents report that in the week there was an encouraging improvement in market conditions.

The great majority of the orders booked in the past week called for single tools and were from miscellaneous users. The buyers were well scattered geographically and the orders were well diversified in the matters of sizes and types. Scattering single orders were received from railroads and manufacturers of automobiles and accessories.

The number and nature of inquiries received in the week are pronounced satisfactory for the season. The great majority of these came from general machinists and miscellaneous users, located in all sections of the country, whose requirements were a well-diversified line of single tools. It is stated that medium-sized lists of requirements were received from concerns in the electrical field. A number of small inquiries are reported as having been received from foreign fields.

Production is reported to be at a normal level for the season and the expectancy is that manufacture will be sustained by orders booked and coming in.

DETROIT

Few orders have been placed here within the past week and indications are that business in the machinery and machine tool trade will drop off considerably during the next few weeks. For a time there was an unexpected flurry of business here, unusual at this time of year. Now, however, the regular summer slump has apparently set in and although there is still a fair amount of buying and considerably more than at this time last year, it is by no means as brisk as it has been. Whatever business there is, for some reason or other, is all rush work.

Ford is still placing a great deal of work with the small shops and as a result of this these shops are in the market for some equipment. Packard is buying, the Ford Motor Co. itself is doing some buying, as are Graham-Page and the Wilson Foundry Co. of Pontiac. Many of the General Motors units are either in the market or are planning purchases. A great many changes are in the immediate offing, and it is generally expected that business will be unusually good this fall.

General business conditions here are very good. The employment level is still improving and people in general are optimistic.

NEW ENGLAND

Business among machinery and machine tool manufacturers in the New England section continues at a normal level. New orders during the week, according to representative builders and dealers, were confined to the smaller type of machines, and inquiries were light. Makers of automatic screw machines were favored by substantial orders, and dealers in used equipment profited in the same line. Manufacturers of wire-forming machines are doing a substantial business with the domestic-products manufacturing industry.

July to date holds to a level that promises to bring results well above the average for this summer month. The half year just completed has given the industry, as a whole, sufficient leeway to keep it prosperously occupied until the end of the year. Some manufacturers did more business up to the end of June, this year, than they did throughout last year.

One manufacturer of machine tools explains his company's favorable business, thus: "One of the reasons we are enjoying good business is because we are pushing new machines on which we can make a reasonable profit and by the use of which our customers can realize a reasonable profit. That, we believe, is the slogan New England industry in general should adopt. We are buying new machinery ourselves for use in our plant that enables us to manufacture new and better products for our customers at lower costs."

The National Acme Co., Windsor, Vt., is adding additional help to meet production schedules. The New Britain Machine Co. started operating night shifts this week in its special machine and machine tool departments. This places 50 per cent of the entire plant on night schedules. The Bangor & Aroostook R.R. has awarded contract for a 10,000-ton capacity, automatic electric coaling station at Northern Maine Junction.

CLEVELAND

The local machinery and machine tool business has lapsed into a coma of summer dullness. There is little activity, purchases being confined to single tools and replacements. The spurt that was evident during the last half of June has entirely subsided. Inquiries are holding up, however, and it is the general feeling that the present lassitude will not last long. Production is on the increase, and night shifts are being used to consummate orders on hand.

The majority of machine tool manufacturers and selling agents in this district regard the first six-months' business as satisfactory. The sales chart showed a steady even line with a downward curve in May that rose again during June.

CHICAGO

With scarcely an exception, business in the machine tool industry is reported by dealers, distributors and manufacturers' representatives as continuing on the same good level that has characterized it for the last several weeks. July thus far has developed an amount of trade in practically all lines of tools that had been quite unlooked for. Machinery men, who as a general thing take a conservative view of the trend of the market, now are quoted as forecasting a continuation of present good conditions throughout this month, and the probability of their overlapping into August.

This optimism to some extent is predicated on sustained activity in the production of farm implements and tractors, increased production on the part of automotive plants and new inquiries from railroad interests, the St. Paul, the Burlington, the Northwestern and the Rock Island having within the last few days either asked for new bids on needed equipment or started to buy against lists in the hands of sellers. Some new business has come from two Wisconsin motor manufacturing plants, and the demand from general industrial sources is keeping up.

Inquiries for used tools are being received in fairly good volume, and dealers in this line are encouraged as to the outlook.

MILWAUKEE

While there are no important developments in the market for metal-working equipment, the fact that the volume of business is fully holding its own seems to be a matter of much encouragement to manufacturers and dealers alike. Ordinarily, at this season of the year, a perceptible lull sets in, but so far this has been absent and expectations are that there probably will not be any sharp letdown in the demand. Business is not at the peak reached earlier this year, but it is coming in sufficient quantity to keep most plants busy. In some instances, inroads on working forces by vacations, usually a welcome

development of midsummer, are somewhat irritating because it is difficult to procure skilled machine shop help to compensate for absentees.

Round-lot buying still remains a stranger to the tool trade, but the run of orders for one or two items makes up a fair aggregate, which in most shops keeps sales quite even with deliveries. On this basis there has been an unusually small change in the production curve all this year, compared with the tapering that usually makes itself evident as early as June.

Inquiry from automobile factories is improving, after a short period of relative quietude. The state of the passenger car business is so favorable that the tool trade is finding considerable comfort on contemplating prospects for a better demand from this group in the coming months. The agricultural machinery industry continues to prosper, and furnishes a steady demand for equipment. Makers of contractors' machinery are having a more active summer season than customary and while their requirements are confined largely to replacements, prospects are for the need of some additional capacity soon.

NEW YORK

Machine tool dealers in the New York market are about holding their own, and no indication of the usual summer slump has been found, except perhaps the fact that some firms are finding their sole customers in the General Electric Co. and the Wright Aeronautical Corporation. At the latter company, while a steady flow of orders is noted, no sensational buying has actually taken place as anticipated. Certain other dealers, on the other hand, report a well-scattered business with plenty of prospects in sight for future orders.

For example, single orders were received for a power hacksaw, a Swiss jig borer, a P. & W. jig borer, a P. & W. 14-in. vertical surface grinder, a Victor nut-facing machine, an Espen-Lucas cold saw, several Campbell nibblers, a LeBlond lathe, a Carlton radial drill, some Edlund sensitive drills, and two Cincinnati press brakes, to mention some of the tools called for on orders received by three companies for the local market. The Pratt & Whitney Co. also received orders for two Sigourney drills, a cutter grinder, two vertical surface grinders, four 5-in. hand production millers, and two other jig borers, all for shipment outside this territory. The Niles Tool Works Co. sold a 27-in.x18-ft. Timesaver lathe, and a 72-in. duplex control borer.

Production of Farm Equipment Steady

The Department of Commerce announces that, according to data collected at the annual canvass of manufacturers of farm equipment, the total production of such equipment in 1927 was valued at $459,574,443, as compared with $461,399,528 for 1926 and $391,812,436 for 1925. The 1927 total shows a decrease of nearly four-tenths of one per cent from that for 1926, but an increase of 17.3 per cent over the total for the previous year.

Business Items

The Grays Harbor Iron & Steel Co., Aberdeen, Wash., and the Lamb Machine Co., Hoquiam, Wash., have merged under the name of Lamb-Grays Harbor Co., with general offices at Hoquiam.

The Detroit Piston Pin & Manufacturing Co., of Grand Haven, Mich., has changed its name to Ottowa Steel Products, Inc., and the capital stock has been increased from $25,000 to $50,000 to take care of increased business. Centerless ground parts continue to be a speciality, and piston pins the leading item.

Robbins & Myers, Inc., has purchased the assets of the Robbins & Myers Co., Springfield, Ohio, manufacturer of electric motors and fans, including the Robbins & Myers Co. of Canada, Ltd., from W. J. Myers, receiver of the old company. It is understood that Mr. Myers will become permanently identified with the new company as one of the principal executives.

The Southern Iron & Equipment Co., Atlanta, machinist and manufacturer of locomotives and other railroad equipment, suffered a loss of several thousand dollars a few days ago when lightning struck and partially destroyed the power house and foundry by fire. Considerable damage was also done to expensive machinery and other equipment. Repairs will be made immediately, according to Frank P. Kern, president and general manager.

The Emerson-Brantingham Corporation, Rockford, Ill., has sold its plow, tillage and combines plant to the J. I. Case Threshing Machine Co. of Racine, Wis., and formal transfer of the plant will be made August 1. The plant, it is expected, will be considerably expanded as the Case company rounds out its line with plow, tillage and harvesting machines. The Emerson-Brantingham corporation will retain and expand its industrial products division.

Heat Transfer Products, Inc., has been formed as a division of the Staten Island Shipbuilding Co., with headquarters at 90 West St., New York, N. Y. George T. Jacocks, formerly vice-president of the Whitlock Coil Pipe Co., is president and general manager. S. J. Crooker is vice-president in charge of engineering, and W. S. Ogilvy, vice-president in charge of manufacture, and secretary. G. G. Bates, secretary and treasurer of the Staten Island Shipbuilding Co., is treasurer.

Personals

F. E. VIGOR has been appointed assistant works manager of the Ashland (Ky.) division of the American Rolling Mill Company.

FRANK C. NICHOLS, vice-president of Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn., has left on a business trip for the company to England.

BLAKE R. VANLEER, assistant professor of mechanical engineering in the University of California, has been appointed assistant secretary of the American Engineering Council, succeeding A. C. Oliphant, resigned.

DR. W. R. WHITNEY, director of the research laboratory of the General Electric Co., at Schenectady, N. Y., has been elected a vice-president and director of research.

CARL R. ENGLISH has been appointed purchasing agent for the Pacific Coast Cement Co., the Pacific Coast Coal Co., the Pacific Coast Engineering Co., and the Pacific Coast Steamship Co., all affiliated interests, with headquarters at Seattle.

J. E. HALL, who has been connected for 16 years with Hill, Clarke & Co., of Boston, and later with their successors, Steadfast, Roulston & Co., has joined the Triplex Machine Tool Co., 50 Church St., New York, as machine tool salesman.

W. C. GOODWIN, formerly section engineer of the control engineering department, has been appointed manager of the renewal parts engineering department of the Westinghouse Electric & Manufacturing Co. of East Pittsburgh.

W. S. LYNCH, formerly district manager at Seattle, has been appointed manager of the Cincinnati office of the Chicago Pneumatice Tool Co., of New York. He succeeds T. G. Smallwood, who is on indefinite leave on account of ill health. A. M. Andresen has been appointed acting district manager of the Seattle office.

O. H. DAVIDSON, president of the O. H. Davidson Equipment Co., Denver, Colo., has been appointed Denver district manager of the Oliver Iron & Steel Corporation, of Pittsburgh. He will represent the bolt, nut, rivet and pole-line material departments.

DR. EDWARD DEAN ADAMS, engineer and financier of New York, has received an honorary doctorate from the University of Louvain, and has been made Commander of the Order of the Crown by the Belgian Government. Dr. Adams represented the Engineering Foundation at the dedication, July 4, of the Louvain Library and Engineers' Memorial Carillon.

Obituaries

FREDERICK P. REINHART, treasurer of the Standard Screw Products Co., Detroit, died on June 29 after a brief illness.

MORRIS M. TITTERINGTON, vice-president and chief engineer of the Pioneer Instrument Co., manufacturer of aeronautical instruments, was killed in an airplane accident on July 11. Mr. Titterington was the inventor of the earth inductor compass.

MAJ. JOSEPH A. STEINMETZ, inventor of anti-aircraft devices and a pioneer in the development of aviation in this country, died in his 59th year on July 11. During the war he was a member of the National Research Council. Later, he organized the engineering firm of Janney, Steinmetz & Co. He was a member of several technical societies including the Society of Automotive Engineers and the Franklin Institute.

Forthcoming Meetings

Canada's Steel and Power Show. Second annual show to be held at the University of Toronto Arena, Sept. 4-7. Secretary, Campbell Bradshaw, 24 Front St., Toronto, Ontario.

American Railway Tool Foremen's Association. Annual meeting, Hotel Sherman, Chicago, Sept. 12, 13 and 14. G. G. Macina, secretary, 11402 Calumet Ave., Chicago.

American Railway Tool Foreman's Association. Sixteenth annual convention of the Supply Association, Hotel Sherman, Chicago, Sept. 12, 13 and 14. F. A. Armstrong, secretary, the Pratt & Whitney Co., 564 W. Monroe St., Chicago.

National Safety Council. Seventeenth annual safety congress will be held in New York, October 1-5. Idabelle Stevenson, executive secretary, 1 Park Ave., New York.

American Society for Steel Treating. "National Metals Exposition," Commercial Museum, Philadelphia, Pa., week of Oct. 8. W. H. Eisenman, secretary, 4600 Prospect Ave., Cleveland, Ohio.

American Welding Society. Fall meeting and exposition, Exhibition Hall of Commercial Museum, Philadelphia, Pa., Oct. 8-12, in conjunction with "National Metals Exposition" of the American Society for Steel Treating. Miss M. M. Kelly, secretary, 29 West 39th St., New York City.

Institute of Metals, Division of American Institute of Mining and Metallurgical Engineers. Annual fall meeting during National Metal Week, Oct. 8-12, Benjamin Franklin Hotel, Philadelphia. W. M. Corse, secretary, 810 18th St., N. W., Washington, D. C.

American Gear Manufacturers Association. Semi-annual meeting, Statler Hotel, Buffalo, N. Y., Oct. 11-13. T. W. Owen, secretary, 3608 Euclid Ave., Cleveland, Ohio.

American Management Association. Autumn convention, Palmer House, Chicago, Nov. 13-15. W. J. Donald, managing director, 20 Vesey St., New York City.